The Chemical Age

A Weekly Journal Devoted to Industrial & Engineering Chemistry

VOL. II. MARCH 27, 1920 No. 41

Contents

Index to Advertisers, see page iii.

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Other communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to "The Chemical Age" is 21/- per annum for the United Kingdom, and 26/- Abroad. Cheques, P.O.'s, and Postal Orders should be payable to Benn Brothers, Ltd.

Editorial & General Offices—8, Bouverie Street, London, E.C.4.
Telegrams: "Allangas, Fleet, London." Telephone: City 9852 (4 lines).

British Trade Tours

THIS week's issue of the CHEMICAL AGE is the first Spring number we have published, and special arrangements have been made for its circulation in export markets. As recent returns have shown, the development of British export trade is of great importance, and an interesting experiment is contemplated by the Government. With the object of stimulating our export trade, especially within the Empire, the Department of Overseas Trade propose to organise a series of British trade tours. The intention is to concentrate especially on markets in which British manufacturers and merchants may find permanent customers, rather than on those where there may be for the moment a keen but only a passing demand. Our own Dominions offer, in the first instance, the most promising field, for South Africa, Australia, New Zealand and Canada took 43 per cent. of their imports of manufactured goods from this country before the war. By means of organised trade tours it is hoped to bring British products directly under the notice of traders, not only in the British Dominions, but also in South America, the Far East, and the United States. These proposed touring exhibitions will mark a distinct departure from the usual type of stationary trade fair. Useful as the existing annual British Industries Fairs are for the purpose of bringing the range and the quality of British products before the notice of visiting buyers from abroad, the proposed tours contemplate a far greater service to the British manufacturer who desires to expand his export business by taking samples of his wares direct to the overseas buyer in the latter's own town or country. An enterprise of this nature has not hitherto been carried out officially by any nation to develop its export trade, and the practical value of such a scheme is recognised by at least two foreign Governments, which are now contemplating the official adoption of a similar policy. It may be urged that at the present time a large number of manufacturers in the United Kingdom are already booked with home trade orders which will absorb their output for many months ahead, and that they are, therefore, unable now to cater for export trade. It is, however, a short-sighted policy to look neither around nor ahead, and a manufacturer who concentrates on producing for the home market to the exclusion of overseas trade, while his foreign competitors are successfully establishing themselves in new markets abroad, will inevitably regret his policy when the present abnormal manufacturing activity comes to an end.

At present four touring exhibitions are contemplated. The first, the preparations for which are most advanced, will make a tour of the British Dominions. It will leave England in June next, visiting the chief cities in South Africa, Australia, New Zealand and Canada, and returning about July, 1922. The other three tours under contemplation will visit the principal commercial centres in South America, the Far East, and the United States of America respectively. It is estimated that the displays will be on view for about a fortnight in each city. The exhibits will be packed, carried, and displayed in specially designed show cases and packing cases, which will remain the property of the firms. The scheme is self-supporting and it is anticipated that on a basis of 500 exhibitors each tour will cost from £200 to £250 (excluding the cost of show and packing cases) per unit of space. Firms may apply for a half unit, or for one or more units, and there are five different types of show cases adapted to the varying requirements of particular trades. It is hoped that the three tours to foreign countries will leave England during the last few months of this year. The Far Eastern tour will include in its itinerary some of the chief commercial centres in India,

Siam, the Straits Settlements, Dutch East Indies, China and Japan, and possibly Egypt, the complete journey occupying about two years. The South American tour will leave the United Kingdom in the late summer or early autumn, visiting probably Lima, Santiago, Buenos Ayres, and Rio de Janeiro; and the U.S.A. tour will go to New York, Philadelphia, Atlanta, St. Louis, Chicago and San Francisco. British firms who are interested in any or all of these tours are advised to make early application for an allotment of space, as the total number of units in each tour will be limited to 500. Moreover, it is desired to proceed with the necessary arrangements as soon as possible, in view of the proposed organisation of similar trade tours by at least two foreign Governments. For the Dominions tour only applications received not later than March 31 can be guaranteed consideration. A pamphlet containing full particulars of the four tours, with provisional application forms for space units, may be obtained by interested firms from the headquarters of the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1, where specimens of the special types of standard show cases to be used on the tours are on view.

The Fine Chemical Trade

We publish to-day the third of the series of articles on the present position and future prospects of the fine chemical trade in this country. In this article the writer puts forward a suggestion which in his opinion might, if adopted, lead to a development of the trade along sufficiently large and sound lines in this country. That the suggestion made is open to criticism is, perhaps, obvious, but as we understand the point of view of the writer the remedy put forward is designedly basic only and should be regarded as such. If only a portion of what the articles state is true, the condition of the trade is such that only a drastic remedy can be of any real service. We do not believe that the Fine Chemical Trade of England is ever going to be satisfactorily built up on any but the broad lines of wise co-operation and far-reaching foresight which distinguished the German undertakings, and it is useless to pretend that anything approaching such an effort is in sight here.

To take only one instance—that of chemicals as supplied before the war to universities and research laboratories by firms like Kahlbaum and Merck—users are only too anxious to buy the goods here, but inquiries are almost invariably met with lame excuses or blank refusals. On the other hand, the proposals made in regard to a central buying and sales organisation are somewhat controversial. The chemical merchant performs a definite and useful function, and except in the case of very large organisations it is doubtful whether economy results from a policy which sets up more expensive machinery for the purpose indicated. The tendency amongst manufacturers to eliminate or to restrict the business of the merchant will probably defeat itself in the end or lead to retaliation, and in our view the wiser policy is to promote a better understanding of the individual functions of what should be a happy chemical family.

It is probable that the answer to these articles will be along the well-known line that the writer does not know the under-currents which are working, or are stated to be working, towards the desired end. If such a statement is made his reply would undoubtedly be a plea for revelation. The cards should be on the table. We are hopeful that someone qualified to do so will make a statement of the present position which will bring encouragement and hope to those who are watching, with not a little fear, the present tendency of the markets. We invite such a communication, and if it can show that things are not as bad as they seem, and that the opinions expressed in these columns are exaggerated because so little is known, then we feel sure that no one will be better pleased than the writer. But can such a statement be made? And if not, should it not be possible for someone to invite that co-operation and confidence which is an absolute necessity for the welfare of the trade, if but a small portion only of the indictment be true?

Ideal Carbonisation

We notice in the current issue of *The Times Engineering Supplement* an article which suggests that modern methods of extracting the potential energy from coal by means of distillation are not as economical as they might be. The writer draws an alluring picture of gas at about 2s. a thousand—a figure fairly common in 1914, but now almost forgotten—and points out that this millenium will only be attained by adopting the principle of complete gasification of coal. Nearly all chemists are more or less familiar with the process of carbonisation as it is ordinarily carried out, and it will be appreciated that the final mixture of straight coal gas and water gas, as commonly supplied in the towns' gas mains, is produced by employing two distinct processes. In other words, the coal is first distilled in retorts yielding coal gas, while the residual coke is then quenched, transported to another part of the works, heated up again, and finally turned into water gas. Such a succession of processes scarcely appears to savour of economy from either a thermal or handling point of view, and there would seem to be a good deal to be said for any system which segregates all the above-named operations and produces the two varieties of gas simultaneously.

Explained briefly, the modern school of carbonising engineers sets out to accomplish complete gasification of the coal in one operation—that is, coal is fed into the apparatus, the whole of its combustible matter is directly converted into gas, and only ash is removed from the opposite end of the plant. In theory, such a principle has for long been regarded as the ideal, but its progress has been obstructed by mechanical difficulties, and, more particularly, by the somewhat narrow ideas which Parliament and various local authorities have held with regard to gas quality. Now, however, responsible departments, such as the Board of Trade, are beginning to appreciate that, in connection with highly technical subjects, the opinion of the specialist is usually more reliable than that of the local butcher who, after he sits on the town council, considers he knows more about, say, lights than does the responsible local gas engineer. Pri-

vately-owned gas undertakings have for too long been subjected to arbitrary opposition whenever they have attempted to progress; but now that the shackles are being cut there is immense scope for scientific development. Whatever new processes may be thought out—and complete carbonisation is only one of them—the modern gas engineer, who has been a trifle arrogant in the past, will do well to remember that, although he may prefer to be hall-marked as a civil engineer, he should essentially be a chemical engineer, and that a highly-trained chemist is the *sine qua non* of his machinery. Perhaps no better illustration of this axiom is wanted than that of the new idea of carbonisation; for, whereas the mechanical difficulties may be said to have been solved, there still remain problems which the chemist alone can unravel.

Too Many Chemical Students?

THE point which Dr. M. O. Forster mentioned at the close of Professor Morgan's lecture on the dye industry on Saturday evening is one to be kept in mind equally by educational authorities and by young persons contemplating chemistry as a profession. A kind of romance has grown up round chemistry as the result of the part it played in the later developments of the war, and the public have realised how much larger a national interest it is than they had ever before imagined. Together with this, we have constant reminders that the chemist is now indispensable in industry, and suggestions that he must be utilised to a much larger degree than formerly in all manner of industrial works. The combined effect upon the class of young people who are looking out for careers is to represent the chemical profession as an alluring field offering at once a fascinating vocation and a good financial return.

Up to a certain point this is quite satisfactory; the danger lies in excess. Chemistry does indeed offer a fine field for the scientific mind, but it calls for hard work, and its rewards, if the small percentage of high appointments is excluded, are not exactly princely. There is a possibility of tempting too great a multitude of students into the profession to be disillusioned later, and there is need, consequently, of the movement being kept within bounds. It is certain that British industry will require in the future more well-trained chemists than it has ever employed in the past; certain also, that the remuneration will have to be on a more generous scale if science is freely to serve industry. But the employing class will require a good deal of education before these visions are realised, and in the meantime it is a kindness on the part of such authorities as Dr. Forster to protect prospective students from extravagant and illusory hopes.

Dye Manufacturers and Users

THE conference held in London last week between British manufacturers of dyes, intermediates, and heavy chemicals and consumers of some or all of these products, may prove to be a practical step towards a better and much-needed co-ordination of these interests. It appears to have been called by the Board of Trade; at any rate, an official of the Board presided over the discussion. It became clear at once that at present there is a serious lack of understanding between makers and users, resulting in a certain amount of dissatisfaction among the latter and of criticism of the former's arrangements. One difficulty is the failure of the colour users to indicate with sufficient exactness what their immediate and future requirements are likely to be. They themselves acknowledge the difficulty of ,making exact estimates, and yet, as the conference unanimously recognised, until the manufacturers know what is wanted it is impossible for them to meet the requirements.

While it was recognised that the British Dyes Corporation has undoubtedly made remarkable progress, as from time to time we have pointed out, other manufacturers are hampered by want of knowledge of what the corporation is doing, and are disinclined to risk the duplication of processes in competition with a great combine, in which the Government has a direct interest. This applies to dyestuffs generally, and especially to the manufacture of intermediates. The point has already been discussed by experts in our columns whether the manufacture of intermediates is better centralised or decentralised. For the present, at least, the policy of centralisation seems essential for the foundation of a home-dyestuffs industry, and it is represented in the organisation of the British Dyestuffs Corporation. If, however, other firms care to undertake the manufacture of intermediates, they should be given all reasonable facilities, and not excluded by any form of monopoly. All these matters are best discussed among themselves, by the interests concerned, and the frank interchange of views which took place at the conference may do something to clear the air. The meeting resulted in the formation of a committee of six, with Mr. W. J. U. Woolcock, M.P., general manager of the Association of British Chemical Manufacturers, as convener.

The Calendar

Mar. 29	Chemical Industry Club: "Should Chemists as such be Represented on the Whitley Council for the Industry?" 8 p.m.	2, Whitehall Court, London.
30	Sheffield Association of Metallurgists and Metallurgical Chemists: "The Laboratory as a Training Ground for Works Management." John R. Hyde.	Sheffield.
April 8	Association of Engineering and Shipbuilding Draughtsmen (Chesterfield Sub Branch): "The Destructive Distillation of Coal." E. Nicholson. 7.30 p.m.	Grammar School, Chesterfield.
9	Society of Chemical Industry (Manchester Section): "Carbon Dioxide Recorders and their Application in Boiler Efficiency Control." B. A. Oldham. 7 p.m.	Grand Hotel, Manchester.
10	North of England Institute of Mining and Mechanical Engineers. 2 p.m.	Newcastle-on-Tyne.
12	Society of Chemical Industry (London Section): "The Fertilising Value of Sewage Sludges," by Dr. Winifred Brenchley and E. H. Richards. "A New Test for Incorporation," by Dr. E. P. Perman. "Experiments on Decrepitation," by T. Martin Lawry and L. P. McHatton. 8 p.m.	Chemical Society, Burlington House, Piccadilly, London

Easter Arrangements

Next week THE CHEMICAL AGE *will be published earlier than usual. Communications intended for insertion in that issue should reach us not later than Wednesday morning, March 31.*

The Fine Chemical Trade: Where Are We?

By a Small Manufacturer

III.—A Possible Remedy

We have now looked a little roughly at the present position of the Fine Chemical Trade, and we have diagnosed to my satisfaction, of course, the principal cause and the contributory causes. What is the remedy?

It is useless crying for the moon. We cannot alter our national nature, neither can we make the blind to see or the short-sighted far-sighted in such a matter. It is useless to appeal to anyone to take action for the good of the trade as a whole and for that reason only. Let us make no mistake about that. No scheme that limits individual effort or seeks to confine the activities of a firm already in existence will meet with the smallest success. Whatever scheme is suggested and whoever starts it the first question that will be asked will be, "What is he going to get out of it?" And if there is no financial benefit obvious then he will be charged with seeking glory. Everyone knows this to be true; we have seen it over and over again in almost every new movement in the trade.

So any scheme for cementing the British Fine Chemical Trade into an effective whole must be a practical scheme. It must be a profit-making scheme, and no individual must be harmed or hampered. There must be no possible question in it of individual profit, only pro rata profit, for we have not learned yet in the Fine Chemical Trade to think nationally, much less Imperially. That may come perhaps, but not yet.

Now, is it impossible to find a scheme capable of building up this magnificent trade, and yet escaping the pitfalls I have alluded to? I believe there is. I will state it, not as a finished scheme, but as an idea which, though it is neither new nor brilliant, I lay with the deference of the small man at the feet of the great ones of our trade, for they and they only can breathe into it the breath of life.

First let me state one or two axioms. There is, I think it will be agreed, plenty of room for more capital in the trade. If that capital is employed simply for the formation of a huge new fine chemical factory, then it will be only adding a further sore to the matter.

We are as a trade buying our raw materials badly, mainly because we do not or cannot buy largely enough.

We are as a trade losing large sums yearly in wasted by-products or waste materials.

A large amount of our plant and, therefore, of our capital, is intermittently used or lying idle.

A Central Organisation

Would it not be possible then for the leaders of the trade to form a central company with a really substantial capital, and appeal to the public for support along these lines, after having obtained the support and affiliation of every fine chemical manufacturer in the country who has a modicum of good sense?

The objects of the company should be primarily:—

(*a*) The purchase of raw materials for all or any of the affiliated concerns in such quantities that it can supply those concerns at least as cheaply as they are buying now and retain for itself a small commission.

(*b*) The management of contracts the world over for the supply of finished products, obtaining them direct from the affiliated companies or sub-letting parts of the contracts to them as might seem most desirable.

(*c*) Supplying those manufacturers who require it with raw materials against finished products instead of against cash.

(*d*) Purchasing and distributing to the right places all waste products and by-products.

(*e*) Manufacturing only those things themselves which no manufacturer can supply, but under no circumstances doing so in competition with existing manufacturers, but only in conjunction with them.

(*f*) Definitely encouraging and maintaining the individuality of the manufacturer, large or small.

(*g*) Encouraging the chemist to bring his processes along by offering reasonable terms of purchase and royalties, and placing such processes (and the chemist with the process if needs be) with the best firm for the purpose.

(*h*) Purchasing and distributing unused plant where possible, so that as little waste plant as possible should be in existence.

Let me elaborate the importance of these points a little. The purchase of raw materials in very large quantities is so important a point and would have such far-reaching effects that it requires very little demonstration. At present the trade inside its own walls is buying against itself and in such comparatively small quantities that nothing like the best results are being obtained. It needs no demonstration either to show that the central company would earn a very substantial income by its purchasing commission on such transactions, which commission is paid now in nearly every case, and would be the more readily paid then because the benefit would be tangible. Such an arrangement would have very far-reaching effects also in the direction of securing raw materials on offer against competitors in other countries.

It must be quite clear also that if the central company undertook large contracts nearly all of which would be too large for a single manufacturer to handle, it would save for the English trade a great deal of business now slipping from it and help to keep the factories busy and the plants fully occupied. It would also tend to increase output, regulate prices and equalise loss or low profit in one direction by higher profit in another. The individual manufacturer cannot hope to do this. We all know now how this thing was done in Germany. Is it unreasonable to suppose that it can be done here?

Assistance for the Small Manufacturer

The war has produced a large number of small manufacturers. Many of these are making lines no one else is touching—not even the bigger firms. Indeed, they are often acting "ghost" for the bigger firms, who list their products as their own. These small manufacturers are often short of capital. They are unable to fix up contracts because they cannot be sure of buying their raw materials at the right time and at the right price. They are short of capital because they cannot show these very contracts. The central company would soon alter that. They could supply the contracts and help finance the operation by supplying the raw materials also. They would be safe because they would have a call on the finished products at a fixed price. It is true that in a few cases they might strike a bad instance where their confidence had been misplaced, but even then and under such conditions it should be possible for the central company to be reasonably protected. Let no one run away with the false idea that it would pay the big firms to see the small ones squeezed out of existence. This is not a question of internal competition. It is a question of the English Fine Chemical Trade against the Fine Chemical Trade of the world. Every ounce of help and work is required, and to put it quite bluntly, the big firms never have and never will do it alone. They need the help of the smaller firms who in their turn need the help of the larger firms. For Heaven's sake don't let us throw dust in our eyes at this juncture, or think so pettily.

The purchase and distribution of waste products is of the utmost importance. Thousands of pounds' worth of these waste chemicals are being discarded to-day in England simply because there is no means of disposing of them. They are all worth something, and they represent a millstone weight upon the neck of the trade far greater than is perhaps realised. We know now that the German manufacturers wasted nothing.

It should be a specific policy of the central organisation that it should not enter into manufacturing competition with existing manufacturers; but it should be prepared to supplement special lines if needs be, or subsidise on suitable terms proposed increases of plant for the supply of goods actually required, now either unobtainable or obtainable only in insignificant quantities. In this way the individuality of the manufacturer would be maintained—a most healthy condition under proper circumstances.

It is perhaps needless to emphasise the value of such an organisation to the individual chemist. Nor is it necessary, I am sure, to point out that if the trade through a trusted central company could have the benefit of the brains, and, if necessary, the active work of individual chemists it would very materially

benefit. One hesitates to allow one's mind to seriously contemplate the waste of effort that is going on to-day in duplicate research. It cannot all be avoided, doubtless, but much of it can.

The last point needs little underlining either. There must be in every works discarded plant in good condition when discarded, but finding its way slowly into the hands of the dealer or on to the scrap heap. If the central company could help to distribute such plant from where it is useless to where it can be used, it is clear that much worry and time could be saved.

Wanted, a Lead

It is not my purpose here to attempt to elaborate the business details of such a scheme. One has one's own ideas of the capital required, the formation of the board and of subsidiary committees, the method of management and the arrangement of the shares. Such details must come from those whose names would seal the quality of the undertaking. It may be, indeed one has little hope that any other result will be secured by such articles as these, that the scheme will be regarded as chimerical and impossible. Emanating from no known person without the sanction of the great names of the trade, it will perhaps be disregarded.

But is this scheme, or something like it, impossible? If we must, as I suppose we must, come down to that level, there is money in it. It is a big matter and requires the best brains the trade can give, but is it the worse for that? Is not the whole problem a big one, and the whole difficulty a big one requiring a big remedy? Is not the trade a big thing itself, and cannot it be made very much bigger than it now is?

Is there on one person or group of persons in the trade who can see that only by some such plan as this, improved, amplified and regulated to fit circumstances, I, amongst others may know nothing of, can the trade be saved?

Epilogue

If the great war has taught us nothing and God knows it should at least have taught us the benefits of unified command, then what will happen in the great trade war in fine chemicals which must come? How can the trade hold its own? If we are relying on a permanent protection we are relying on a support with a rotten foundation based on the uncertainties of politics. It won't do. Think of a steadily recovering German Fine Chemical Trade, an increased American and French Fine Chemical Trade. Prices crumbling right and left. Violent competition for raw materials and still more violent competition for contracts. Think of these things and pit against it the trade as it stands to-day. The small man goes out with the first puff. He depends on high prices now. And the big man? He does not go out as a trading entity, but he will find it cheaper and more profitable, as he did before the war, to buy and sell. He will become a camouflaged merchant again.

Again I say, let there be no ostrich work about this business. There are four big factors in the case—the few bigger manufacturers, the many smaller manufacturers, the merchant, and the chemist. None of these can get along without the others.

The big fight *is* coming. We've got the pluck, we've got the brains, and we can get the money. The only thing that seems to be lacking is the sense to co-ordinate all these forces; only that!

THE MEMBERS of the Cotton Textile Industries Association for Oils and Fats at their annual meeting on Friday, March 19, passed a resolution to dissolve. The Association's active operation ceased nearly a year ago, when controls in oils and fats were removed, but, at the express request of the Ministry of Food, the Association remained in being in case its services were needed again. The Committee have placed on record their thanks to Messrs. Millward & Co. (Drysalters), Ltd., who acted as the Association's wholesale distributors for castor and other oils, and Messrs. Bramwell & Co., who acted in the same capacity as regards tallow. During the closing years of the war the Association fulfilled a valuable function in obtaining and rationing supplies of oils and tallow needed in the various sections of the entire cotton industry. Before dissolving, the members, with the sanction of the Food Controller, altered the rules so that the disposable balance of assets will be handed over to the British Cotton Industry Research Association, instead of being distributed in amounts of a few shillings among the 2,000 members of the Association.

German Potash Industry

Present Position

IN a general review of the German potash industry the *Industrie und-Handels-Zeitung* states that during the last five years the increase in the number of workable mines has diminished. In the year 1913 46 new mines were added (from 114 to 160); in 1914 33 new mines were sunk; in 1915 seven, in 1916 six, in 1917 three, and in 1918 and 1919 one each. Now that 13 Alsatian mines have been ceded Germany has 206 mines working, producing the following percentages of the total production:—151 producing 90·3 per cent., 47 producing 7·9 per cent., eight special factories, 1·8 per cent.

The production of Alsatian mines was distributed as follows:—Six producing 4·5 per cent., seven temporarily producing 1·5 per cent.

Another four shafts are being sunk, making a total of 17 mines. Seven of these belong to the Deutsche Kaliwerke, four to the Glückauf-Sonders-hausen, two to Wintershall, and four to the old Alsatian, or, rather, French company Aktien-Gesellschaft St. Therese.

Hitherto the Alsatian potash industry was responsible for about 6 per cent. of the total export, and according to expert opinion this might be increased to about 15 per cent. The Alsatian mines are capable of further extension, and the number of mines might be increased to 35; but in view of the great difficulty in sinking fresh ones this authority considers that it will hardly be possible to carry out this project just yet.

Output

On account of labour troubles, the *Board of Trade Journal* states, the output of the works sank to a minimum in 1919, and it was not until the middle of the year when the question of wages and the 7½-hour day for miners and the eight-hour day for labourers was settled, that conditions improved. Since that time the output of the potash industry has increased.

Owing to the present industrial conditions and the shortage of transport during the first six months of the year production diminished to a great extent. Up to the end of November the total production of pure potash amounted only to 730,000,000 kilog. as compared with 910,000,000 kilog in the preceding year. The production for 1919 was estimated at about 800,000,000 kilog. The following table shows the production for the years 1913 to 1918:

	Mill. kilog.	Value, Mill. marks.
1913	1,110	192
1914	904	156
1915	680	106
1916	884	155
1917	1,004	231
1918	1,003	288

During the war home consumption increased to a great extent, as shown by the following table:—

	Kilog. pure potash.
1913	604,282,800
1914	537,809,200
1915	567,123,500
1916	725,043,700
1917	871,177,600
1918	850,716,400

The average price per 100 kgs. of pure potash during the years 1913 to 1918 varied from 17·50 marks to 29 marks—a range in increase of 70 per cent. Up to date the figures for 1919 have not been published, but as during last year home prices increased a further 175 per cent., in spite of the considerable decrease in output, the turnover should not fall far short of 500,000,000 marks.

Fresh Share Capital and Dividend

The potash industry, unlike most industries, was unable to be turned to war production, and there was naturally a great decrease in revenue. Some works, such as Burbach, Walbeck, Wilhelmshall, and Beienrode, which hitherto had paid good dividends, were obliged to put themselves on a sounder financial footing by the issue of a large number of new shares. From the beginning of 1914 to the end of 1919 a total of 125,000,000 marks were issued in new shares, as follows:—In 1914, 28,000,000; 1915, 21,000,000; 1916, 27,000,000; 1917, 13,000,000; 1918, 16,000,000; 1919, 20,000,000.

A total of 17,000,000 marks was issued in bonds. From the beginning of the year 1914 until the end of 1919 nearly 80,000,000 marks were paid out in dividends by 24 companies and nine joint-stock companies, as follows:—In 1914, 14,000,000; 1915, 3,000,000; 1916, 6,000,000; 1917, 10,000,000; 1918, 31,000,000; 1919, 16,000,000, as compared with 26,000,000 in the year preceding the war.

Mining of rock salt has developed to a certain extent. Until the outbreak of war rock salt had played quite a subordinate part in the potash industry, but owing to the foreign sources of supply being cut off it became of considerable importance.

THE NATIONAL ELECTRO-PRODUCTS, LIMITED, an undertaking with $5,000,000 capital, which has oxygen-producing plants in operation in Montreal and Toronto, is about to establish six other plants in Canada.

The Use of the Refractometer in Chemical Industry

By Percival J Fryer F.I.C.

It is remarkable that the refractometer has made comparatively small headway in this country as compared with the extent to which it is used in America and on the Continent. It is encouraging to note, however, that manufacturing chemists are beginning to appreciate its advantages over more haphazard methods, and our contributor shows how it may be readily applied to the control of works' processes of almost any nature.

THE last few years have seen a noteworthy increase in the use of the refractometer in industrial control and research. This gain in popularity has undoubtedly been due chiefly to the ease, rapidity and convenience of the determination of the refractive index as made on the Abbe type of instrument. No weighings and no calculations are involved, providing that there is suitable control of the temperature and there is thus no opportunity of errors arising. The manipulations involved are of the simplest character. One drop of the liquid enclosed between the prism surfaces is examined in an ordinary light, and a single adjustment of the lever arm gives the result expressed in its final terms.

Assuming that the temperature has first been regulated, a very large number of observations can be made in the course of an hour or so, with the minimum of fatigue. The instrument is thus little short of ideal for the purposes of works' control, where it is necessary to ascertain rapidly whether a certain product is being produced at a uniform degree of strength or purity, or to stop a process when a material has arrived at a certain stage. In many cases of this kind, the refractometer is displacing the much less accurate hydrometer, and the change makes entirely for increased efficiency. The one essential to the utility of the refractometer as a means of works control, is that in the case of solutions, the substance should have a higher or lower refractive index than its solvent, or, in other cases, should vary to a necessary extent from impurities which are liable to be present.

In some cases the refractive index yields no more information of the purity or degree of concentration of a product than does the specific gravity, but its determination is made with so much greater ease and accuracy that it is greatly to be preferred to the specific gravity as a means of works' control. In many cases, however, the specific gravity, although previously employed for this purpose, gives a very inadequate idea of strength or composition, and if used for control purposes has to be supplemented by chemical analysis. It is here that the refractometer has proved most valuable.

To take a single instance of this kind. The author has shown that it is easily possible to gauge the strength of an aqueous solution of nicotine to within almost one-tenth of one per cent. by means of the Abbe refractometer. In this case, the specific gravity yields absolutely no information whatever, because the density of nicotine approximates very closely to that of water. The method actually used in this instance for works' control was the direct titration of nicotine solution with acid, using an indicator—a most unsatisfactory method, since not only is the colour change under the best conditions difficult to observe, but the presence of any other basic substance, *e.g.*, ammonia, entirely vitiates the result, whereas the presence of ammonia affects the refractive index figure to an almost negligible extent.

Works' Control

Although the use of this method of works' control has increased so largely, there are doubtless numbers of instances where it could still be employed to advantage and where its introduction would result in greater uniformity of product, and a marked economy in time and expense. It may be helpful and suggestive to append here a list of the known industrial applications of the refractometer. Such a list is, of course, far from exhaustive, and will necessarily become still less complete as time goes on. It is used as a control in the manufacture and for the analysis of the following groups of substances:—

1. Acetic acid, carbolic acid, and other organic acids or phenols.
2. Sulphate of ammonia, nitrate of potash, and numerous other inorganic salts in solution.
3. Ammonia.
4. Acetone, alcohol, and many other organic solvents.
5. Glycerine, nicotine, pyridine, and most of the organic bases.
6. Essential oils and the terpenes.
7. Fatty oils, fats and waxes, and also fatty acids and other by-products concerned with the industrial application of these.
8. Mineral oils and waxes, and fractionated products derived therefrom.

It will be seen that the above list comprises products used in most of the important chemical industries, and even so it must be far from complete. In fact, it would be difficult to find a chemical industry of any kind in which the refractometer could not be used, either for examination of raw materials or of finished products, or in control of the manufacture.

A reference may here be made to the importance both of the accurate adjustment of temperature in making observations and of the great desirability of a uniform temperature figure in recorded observations of all kinds. The matter was recently investigated by a committee of English experts, who reported in December last, and arrived at the general conclusion that there was no single temperature figure for all observations which could be universally applied. They, however, strongly recommended the figure 40°C. to be applied to fats and oils, and that of 20°C. to other liquids. For observations made in tropical countries, the figure of 28°C. was advised. The matter is, obviously, one for an international scientific conference. It is, of course, possible to adjust observations made at different temperatures by calculation; but since every substance has its own coefficient, such adjustments are not conducive to accuracy, especially when the temperature differences are very great.

A Novel Application

Having referred to the main use of the refractometer in industry, the writer would like to point out a further very valuable function of this instrument in works' control. As far as he is aware, such a method is entirely novel, and has been used for a considerable time in the works with which he is associated. It applies to mixtures of liquids or solutions which form a viscous or semi-solid product, and in which it is difficult to ensure a uniform dissemination of all the constituents throughout the entire bulk of a batch of material.

Many manufactured products are of this nature, and it is usually very necessary to know if, and when, adequate mixture of the constituent materials has taken place. In some cases this is extremely difficult to determine with any degree of certainty, especially in the case of complex mixtures, when even chemical analysis would probably fail to yield conclusive results, and would, in any case, be too slow a method for works' control. In such instances the refractometer will prove of great assistance when used in the following manner:—

Samples are taken from different portions of the batch of material, say, at the top, bottom and middle of the vessel, and examined in the refractometer. If the figure, whatever it may be, is identical in all the samples, there is a strong indication that a homogeneous product has been obtained, and it can be assumed that the mixing has been efficient. If, on the other hand, the samples differ, there is an indication of local excess of one or other of the constituents, proving that the mixing has been inadequate. The reading on the instrument may even be indistinct providing that it is equally so in each sample. Of course, the best control is obtained by this method when the refractive power of the different ingredients used varies to a considerable extent, and in industrial products this will be found to be very frequently the case.

An example from the writer's own observations may be given. It is known that soap gives a fairly definite reading on the Abbe Refractometer, the figure varying with the strength (fatty acid percentage) of the soap. In mixing compound insecticides, of which nicotine is frequently an ingredient, it is often a difficult matter to know when such insecticides have been efficiently dissolved or distributed in the soap. If, however, samples are taken and examined as described above, the mixing is readily controlled in a perfectly satisfactory manner.

Detecting Harmful Ingredients

The importance of such control is often vital in the interests of both the manufacturer and the user. For instance, in the example given, some of the ingredients would do a great deal of harm to the plants on which the finished insecticide is sprayed if present in too large proportions. In other cases, a given portion of a batch of material, say for internal consumption, might be actually poisonous unless efficient mixing had been secured. In almost all cases, while some portions of a batch might be satisfactory, others would be deficient in some of the active ingredients. It is, however, unnecessary to emphasise the importance of uniformity in manufactured products, as this is now pretty generally recognised.

The method outlined above is more or less applicable to the control of manufacture of pastes, creams, and viscous mixtures of all kinds, whether in a state of solution, partial solution, or of emulsion.

Importation of Potash and Dyestuffs

Questions in Parliament

Mr. Raffan (House of Commons, March 24) asked the President of the Board of Trade :—

(1) Whether he has received a communication from the British Chemical Trade Association, dated December 2, 1919, relative to the distribution of dyestuffs received from Germany under the reparation clauses of the Peace Treaty ; if so, why no reply has been given ; and whether any list of the dyes so imported from Germany and a statement as to quantities available has been made public.

(2) Whether earlier notice was given to the Bradford Dyers' Association and the Calico Printers' Association than that published in the press on November 13, 1919, notifying that applications for the dyestuffs referred to must be made by November 20, 1919 ; and, if so, why preferential treatment was given to these trading concerns in view of the fact that the dyes used by them represent less than 5 per cent. of the total dyestuffs consumption of the country.

(3) If he can say why German dyestuffs, imported under the peace treaty and therefore the property of the nation, were not sold by public auction or in the open market, in order to obtain the best possible price, instead of the method employed, by which certain trading associations appear to have received preferential treatment to the detriment of the public purse ; and what steps have been taken, or are proposed to be taken, regarding the distribution of the last and future consignments of the dyestuffs from Germany.

Mr. Bridgeman said the Board of Trade did not see their way to take any action on the Association's communications as they appeared to be based on a number of misapprehensions. The method of distributing the dyestuffs received from Germany as part of the reparation was adopted on the recommendation of the Colour Users' Association, a body representing a large number of consumers of dyestuffs not only in the textile trades, and a still larger proportion of the actual consumption. It was decided that the dyestuffs to be received should be allocated at fixed prices according to proportionate requirements rather than sold by auction or in the open market, so that the smaller consumers should receive a share and not be outbidden by the larger and wealthier concerns, and that allocations should be made only to consumers and not to dealers or other intermediaries. The proceeds of the sale of the dyestuffs are credited to the General Reparation Fund under the Treaty of Peace ; and it is obviously not desirable that the prices charged in this country should be higher than those charged in other countries which also received supplies as part of reparation. The Colour Users' Association prepared a detailed statement of the collective requirements of their members, including the Bradford Dyers' Association and the Calico Printers' Association, without reference to the possible supplies obtainable from Germany, as information on that point was not available at the time. The notice in the *Board of Trade Journal* of November 13 was intended to give consumers not members of the Association a similar opportunity of putting in statements as to their requirements, and was largely so utilised. No preferential treatment of any kind in respect of notification of the classes of dyes obtainable from Germany or of the allocation of dyes received had been given to the two trade associations named by my honourable friend. The question of the desirability of modifying the arrangements in respect of future consignments is under consideration.

German Potash Imports

Sir R. Cooper (House of Commons, March 24) asked the Parliamentary Secretary to the Ministry of Munitions if he would state what was the cost per ton to the Government of the bags for and the bagging of the potash purchased from Germany ; and what was the actual cost per ton of each class of German potash salts bagged, ex ship (*i.e.*, c.i.f.) at the chief port in the United Kingdom.

Mr. Bridgeman said that the average cost per ton to the Government of the bags was 18s. per ton ; the cost of bagging is included in the price credited to Germany. The average cost per ton of each class of German potash salts (bagged) ex ship (*i.e.*, c.i.f.) at the chief ports of the United Kingdom has been : Muriate 80 per cent., £19. 13s. 1d. ; muriate 90 per cent.-95 per cent., £21. 8s. 8d. ; sulphate 90 per cent., £22. 3s. 11d. ; manure salts, 30 per cent., £11. 13s. 1d.

Sir R. Cooper asked the Parliamentary Secretary to the Ministry of Munitions if he will state what is the amount of the gross turnover of the contract for potash supplies entered into between the Government and Germany on which the British Potash Co., Ltd., was entitled to 1 per cent. profit ; and what further profits have been received by, or are still due, to that company under the arrangement by which that company was to receive one-third of any further profit.

Mr. Bridgeman : The gross turnover of the contract for potash supplies entered into between the Government and Germany on which the British Potash Co., Ltd., is entitled to 1 per cent. profit, is approximately £980,000. No further profits have been received by that company, and at the present time it is not possible to state what further profits will be due to that company under the arrangement by which that company is to receive one-third of any further profit. In view of the extra expenses incurred at Rotterdam and Hamburg consequent upon the strikes at those ports, the contract has been rendered less remunerative to the company.

Aluminium Welding Patents

Action Against a British Company

On Thursday, March 18, in the Chancery Division the hearing of the action by the Aktien Gesell chaft für Autogene Aluminium Schweissung against the London Aluminium Company, Ltd., of Birmingham, for an injunction respecting aluminium welding fluxes was terminated. (*See* THE CHEMICAL AGE, March 13 and 20, pp. 281 and 317.)

Mr. Hunter Gray, K.C., for the defence, submitted that there was no subject matter in either of the plaintiffs patents. It had been suggested for them that the great industry of aluminium welding had been introduced by means of the patents. He denied the suggestion because there had been no evidence that aluminium welding had not been done with a flux before the date of the patents. He proposed to put in a document published in 1905, which stated that there was a flux in use then, which was commercially satisfactory. Nor was there any evidence that the patents had anything to do with the development of the industry. The particular prescription described in the first specification had never, within the knowledge of any witness in the case been used for commercial purposes. Not one of the plaintiffs witnesses had mentioned what the composition of the fluxes was, and to-day his lordship did not know a single one of the fluxes which were alleged to have been used under licence from the plaintiffs. They were asked to assume that because the plaintiffs had been granted two or three licenses in respect of a flux the patents were useful. He submitted that the suppression of the evidence was the strongest possible ground that the patents, far from having made the industry, had nothing whatever to do with it. The chemical problem was the same for welding, brazing and soldering. The operation of chlorides for the dissolving and removal of the oxide was well known for soldering, and it was known that it would operate more actively for welding. Therefore there was nothing to invent. There was no evidence that the plaintiffs had anywhere in the world sold an ounce of the material.

Mr. Matthew Atkinson Adam, a well-known expert, was then called and gave evidence on behalf of the defendants.

When the case was resumed on Friday, Mr. J. Swinburne, a well-known expert, said that he had performed experiments with different kinds of fluxes. The only flux he could get which would dissolve the alumina was the fluoride of aluminium sodium.

Mr. Charles Bannister, a consulting metallurgist, said he had made fluxes consisting of different proportions of the chlorides of sodium and potassium, and also fluxes of these mixtures to which fluorides were added, and had come to the conclusion that these were valueless. He had found that lithium chloride was absolutely essential to a flux. He was present when Mr. Restall carried out his demonstration, and he had come to the conclusion that he did his welding without the use of a flux.

On Wednesday, Mr. D. Richardson, another expert, in giving his opinion of the welding experiments performed on behalf of the plaintiffs' case, said the results were indefinite and unsatisfactory. In some cases it was difficult to judge whether a weld had been made because it was well known that it was possible to get an apparently good result when it was really only superficial. He had been unable to obtain a satisfactory weld with a mixture of chlorides.

Mr. James Whitehead summed up the evidence for the defendants and the hearing was adjourned.

We understand that Dr. E. K. Rideal, who left England last August for Illinois, U.S.A., to take up an appointment for 12 months as Professor of Physical Chemistry, has been offered an important position with one of the industrial research associations in the United States.

A Review of the Dye Industry

Lecture by Prof G. T. Morgan

At the Finsbury Technical College, London, on Saturday, March 20, Professor G. T. Morgan delivered a lecture on the above subject to an audience of L.C.C. teachers. Dr. M. O. Forster took the Chair.

Four Basis Factors

Professor Morgan referred to an address delivered by Dr. Levinstein to the Society of Chemical Industry last July, in which he gave four reasons why the dye industry was of fundamental importance to the nation, and was entitled to be classed among the key industries of the empire. These four reasons might be labelled as the economic, military, political and educational. The economic factor arose from the often-quoted circumstance that although the annual requirements in dyewares amounted to about £2,000,000, the capital involved in the dependent industries came to no less than £200,000,000, and about one million of our operatives were either directly or indirectly interested in the adequate supplies of dyes. The military factor was due to the coincidence that synthetic dyes and high explosives were manufactured from the same raw materials. Synthetic colour works were, therefore, potential arsenals. The political reason would not become negligible even if the longed-for League of Nations rendered the military one obsolete. Trade competition would persist even when martial rivalry was abandoned. Peaceful penetration would still be practised. The British Empire possessed practically all the raw materials from which chemical products could be derived. The ideal to be aimed at was surely the development of these natural resources to the extent of making the Empire self-contained in regard to all the chemicals which scientific skill and invention could manufacture. The educational aspect transcended all the others in importance. In spite of the failure of German "Kultur," there was one aspect in which it was superior to other forms of civilisation, namely, in the utilisation of scientific research and more especially of chemical research.

The Importance of Academical Research

Shortly after Berlin's discovery of aniline purple a remarkable reaction was discovered by a young German chemist, Peter Griess, who made the first experiments in Kolbe's laboratory in the University of Marburg, and who, having secured employment with Allsops of Burton-on-Trent, continued his research in the laboratory of that famous brewery. The diazo reaction, discovered in 1858, was seen at once to be a discovery of great scientific importance, capable of throwing important light on the constitution of coal tar derivatives. But, apart from this academical interest, it had proved over and over again to be a process of the highest scientific utility. It had led to the discovery of the largest group of colour matters, namely, the azo dyes. It had been utilised in the synthesis of drugs. Recently it had been employed in the production of poisonous substances for chemical warfare.

In connection with synthetic colours, Professor Morgan pointed out two matters of great interest. The first was the importance of pure research. Griess's investigations which led him to discover the diazo reaction were carried out to elucidate a theory of chemical structure long since superseded. It was originally a work of purely academical interest, but it had proved to be the most industrially important general reaction in organic chemistry. The second lesson which the discovery of azo dyes should teach us was the value of concerted effort. The diazo reaction was discovered in England. It immediately opened up an enormous field of research which was exploited in Germany because at that time there was no other country in the world where the necessary number of trained workers could be found to determine in the laboratory all the possibilities suggested by the new discovery.

There was a further point which required emphasis. Of the many thousands of researches carried out by the chemists of the great German dye factories only a very few, certainly less than 0·1 per cent., had been industrial successes. The occasional triumphs, however, had more than paid for the fruitless research and toil. And what of the men who had made those researches? The many industrially unsuccessful researches were in all probability carried out just as thoroughly and accurately as the very few lucky ones which led to valuable dyes. Whatever the Germans might be on the battlefield they had learnt that it was desirable to treat decently the trained workers who carried on conscientiously the spade work of research. Germany developed the dye industry to an extent unequalled in any other country because of the splendidly unselfish team work of her research chemists. Unless we could develop a similar spirit we should never get English chemists to spend their lives in the research laboratories of great industrial undertakings. A new social order was needed, an inspiration of the factory laboratory by the collegiate spirit and the high tradition which we already possessed in our sports of playing the game not for oneself but for the side.

Synthetic Indigo

Dealing with indigo dyes Professor Morgan said that one of the most romantic episodes in the history of dyes was the story of indigo. The problem of working out the synthesis on an industrial basis was entirely a triumph of German chemistry. In dealing with the steps by which this wonderful piece of scientific team work was accomplished he wished to repudiate a very mistaken view frequently taken of the development of the dye industry in Germany. It had frequently been stated publicly during the last five years that this industry was discovered in England and stolen by the Germans. This was a totally erroneous view of the facts. Misled by such false prophets as Nietzsche and Bernhardi, the Germans were certainly capable of stealing anything, but even their most accomplished looter could not have stolen from us the dye industry for the best possible reason that we never had it. The story of indigo was, perhaps, the best illustration of the way in which German chemists initiated experiments which led to the establishment of the synthetic indigo industry.

Although the Badische process had been a great success in proving that synthetic indigo could be made to pay quite easily against the competition of the natural dye, it was in the course of being superseded by another process in which benzine was the starting point. The German firms owning the patent rights in this invention protected their invention by English patents, and in consequence of the Patent Act of 1907, were compelled to work the process in this country, establishing for this purpose a factory at Ellesmere Port. At the outbreak of war it was assumed that the production of synthetic indigo was too complicated a process for anyone in Great Britain to superintend, and consequently the German manager was retained at Ellesmere Port under a Comptroller to whom a British firm at first supplied phenylglycine made in the German way by combining chloroacetic acid with aniline. Difficulties arose in regard to the supply of the latter substance and the output of indigo came gradually to an end. In August, 1916, the Ellesmere Port factory was transferred to Levenstein, Ltd., and it was then found that the technical intricacies of the indigo problem were the least of the difficulties encountered in re-starting the works. The scientific and other records had been destroyed and the plant had deteriorated owing to the prolonged stoppage. These difficulties, however, had been so far overcome that the Ellesmere Port factory was now turning out more synthetic indigo than was ever the case under the old foreign régime, and the present requirements of the country were being adequately met.

In conclusion, Professor Morgan said that the inestimable value of the war service of chemists was slowly becoming known to the British public, but he was doubtful whether the people yet realised how dependent was the peaceful development of our civilisation on an extensive cultivation of the chemical arts. At the present time a greater number of students were being trained as chemists than was ever the case in this country before the war. Only by very considerable extension of our chemical industries could a career be found for these trained workers. This outlet for chemical ability could best be provided by the establishment within the Empire of a flourishing industry in synthetic dyes and other fine chemicals.

Too Many Chemical Students?

The chairman, in proposing a vote of thanks to Professor Morgan, referred to the huge capital expenditure involved in the furnishing of plant for the manufacture of intermediates. It was because the Germans knew how to make the intermediates in the cheapest way that they had held the mastery of this industry for so long. A reference by Professor Morgan to the need for more chemists led him to sound a note of warning. He was afraid, and the Germans were more than a little afraid, that owing to the enormous advertisement which had been given to chemistry in general and the dyestuffs industry in particular, a large number of people were being hustled into a chemical career without realising what they were letting themselves in for. In his judgment it was not a kindness to encourage anybody to go in for chemistry unless he had a desire to study chemistry and to give his best energies to it in the face of the greatest imaginable difficulties. Unless a boy or a girl showed clearly that he or she was a Heaven-sent chemist, he would not recommend them to go in for it. In Germany a public warning had been issued against the production of so many chemists in the future. He did not want to deter anybody who was fond of it, but it was not wise to hustle unwilling boys and girls into chemistry as a calling under the impression that it was a kind of El Dorado in which enormous sums of money could be picked up.

Cement Marketing Co.

In order to facilitate distribution of their goods, the Associated Portland Cement Manufacturers, Ltd., the British Portland Cement Manufacturers, Ltd., Martin Earle & Co., Ltd., and the Wouldham Cement Co., Ltd., have decided to consolidate their selling and distributing organisations. To effect this consolidation the Cement Marketing Co., Ltd., has been formed, which company will, on and after April 1, solely undertake the selling and distribution of the cement, lime, and other goods manufactured and produced by the above companies. It is pointed out that this re-arrangement of selling methods is entirely a matter of internal organisation, and has no bearing whatever on the question of prices. The directorate and staff of the Cement Marketing Co., Ltd., will consist of those hitherto handling the output of the companies concerned.

Manufacture and Uses of Basic Slag

Papers Before the Faraday Society

A DISCUSSION on "Basic Slags: Their Production and Utilisation in Agricultural and Other Industries," was held by the Faraday Society in the Rooms of the Chemical Society in London on Tuesday. Professor F. G. Donnan, F.R.S., Vice-President, presided.

Sir Robert Hadfield, President of the Society, who was unable to stay to the discussion, referred briefly to the useful work which had been done by the Society, which it was desirable should be placed on record. In particular he referred to the formation of the Nitrogen Products Committee, which was formed at the instance of the Faraday Society. He read two letters which he had received from the Ministry of Munitions thanking the Society for the good work which it had carried out and recognising the work of Professor Huntingdon and Dr. Harker. Sir Robert also dealt with the many other activities of the Society during the war, and the good work done by various individual members.

General Survey by Dr. Russell

Dr. E. J. Russell, F.R.S., opened the discussion with a general survey of the subject of basic slags. He urged agriculturists to remember that basic slag was a subsidiary item in a steel-maker's business, and that it could not be allowed to increase the time necessary for making the steel or to add to the cost of production. On the other hand, the steel-maker should realise that the agricultural demand for basic slag was likely to be very great. Its consumption had greatly increased, and there was no sign that the limit had been reached.

Open Hearth Basic Slags

Mr. G. S. Robertson, M.Sc., in a comparison of the effect of various types of open hearth basic slags on grassland, said that the majority of the open hearth basic slags at present on the agricultural market contained from 9 to 12 per cent. of phosphoric acid. There were, however, very large quantities of these slags containing from 5 to 8 per cent. of phosphoric acid, which present conditions made it impossible to market because grinding and freight charges made their cost excessive. At the same time there was a scarcity of phosphates, and the demand by the agricultural community was increasing at a greater rate than supplies were becoming available. If the phosphoric acid content of these lower grade open hearth basic slags could be raised to a level of 10 per cent., it would be possible to market them and thus to relieve to no inconsiderable degree the existing shortage. The use of rock phosphates for this purpose had been suggested by Professor Gilchrist, and even prior to 1914 was successfully carried out by several manufacturers. The desirability of such a method of grading up these open hearth basic slags turned upon the extent to which these rock phosphates were comparable with the phosphates in basic slag. Professor Gilchrist's results at Cockle Park, Professor Hendricks in Aberdeen, and the writer's results in Essex showed that they were but little inferior as a source of phosphoric acid to the higher grades of basic slag. There were three ways in which rock phosphates could be used: (1) By addition to the furnace; (2) by addition to the molten slag in the ladle; (3) by grinding and mixing with the ground slag. Of the three methods the first was undesirable, as it entailed an alteration in the furnace charge, whilst the third method involved two separate grindings if the mixing was to be thorough. The second method avoided the disadvantages of the other two, and was the easiest to manipulate and control.

The author's conclusions were:—

1. The field trials indicate that open hearth basic slags provide a valuable source of phosphoric acid on soils very deficient in this ingredient, and that these slags can be very profitably used for the improvement of our heavy clay soil pastures and meadows.

2. The laboratory and field results both suggest that open hearth basic slag is not a uniform material, and that important differences may exist between two open hearth basic slags of similar solubility. One may succeed, whilst the other produces poor results.

3. Solubility according to the citric acid test is no criterion, nor yet an approximate indication of the fertilising value of open hearth basic slags compared with high citric soluble basic slags.

4. It is eminently desirable that several series of field experiments on both arable and grassland should be carried out over a period of years with as many different types of open hearth basic slags as can be conveniently procured. It cannot be too often emphasised that they contain a new type of phosphate, and much more information than at present exists is necessary, as well as desirable.

5. It has often been stated that the foundation of a permanent system of soil fertility depends more than anything else upon an adequate supply of phosphates. In view, therefore, of the increasing agricultural demand for phosphates, it is advisable that consideration should be given to the feasibility of grading up the phosphoric acid content of the lower grades of open hearth basic slags in such a way that it may be economically possible to place them on the agricultural market.

Solubility of Basic Slags

The problem of the solubility of basic slags was dealt with in Papers by Dr. J. E. Stead, F.R.S., Mr. F. Bainbridge and Mr. E. W. Jackson, F.I.C. The results obtained indicated that for normal basic slags the solubility increased with the amount of silica present, and also how insoluble natural apatite is in either citric or carbonic acid. The reason why fluorspar made the phosphoric acid in basic slag relatively insoluble was that the fluoride united with the phosphate of lime and produced artificial apatite, which, as regards insolubility, resembled natural fluorapatite. As calcium chloride had the same effect as fluorspar, it might be assumed that chlor-apatite was formed, which was also insoluble. The most soluble slags, which yielded the double salt of calcium silico phosphate, were made insoluble on melting them with fluorspar. It had been proved that the finer the powder, the more phosphoric acid was dissolved out of the insoluble slags by citric acid, and on the same material long continued attack by carbonic acid generally dissolved out more phosphoric acid than a single attack by the standard citric method. As a rule, the more insoluble a slag, the less readily was the phosphoric acid dissolved out of it by either solvent.

Basic Slag in Steel Manufacture

In a Paper on the formation of basic slag in the manufacture of steel, by Mr. Daniel Sillars, it was pointed out that the modern open hearth steel furnace, with all its equipment of cranes, charging machines and hydraulic operating machinery, was too expensive an apparatus to use for the production or treatment of phosphatic manure, excepting when the removal of the phosphorus was necessary to the recovery of the iron in marketable form. Suggestions that mineral phosphates might be charged into the furnace for the enrichment of the basic slag would be practicable but quite uneconomical, as the capacity of the furnace would thus be taken up by material of one-third the value of the steel and occupying three times the volume. If, however, a demand arose for a quality of slag which was not of the composition most suitable to the largest output of steel, it would be necessary for the farmer to offer inducements to the steel maker if he wished him to furnish a slag which was high in phosphoric acid or possessed some quality making it especially valuable as a fertiliser.

The value of the slag as a by-product varied with the demand for steel; in times of high demand it was of greater commercial advantage for the steel maker to adopt a method of manufacture which would increase output even if the by-products and considerations of yield suffered, while in years of trade depression economy of manufacture was predominant, and the importance of yields and by-products was very great. It was in these latter circumstances that a high-grade slag could be demanded at lesser cost to the farmer. Any concensus of opinion which would indicate to the steel maker the direction and probable value of different grades of basic slag would certainly have the effect of causing the steel maker to bend his efforts to the production of slag having the desired qualities.

Increasing the Supplies

Dealing at length with the national aspects of the case for increasing the supplies of basic slag, and especially the importance of producing increased returns from the soil, Sir T. H. Middleton said that to the steel maker the slag which he produced was no doubt a secondary consideration, but he hoped that his concentration on improvements in the manufacture of steel would leave him time and inclination to bestow attention on processes by which the quality and output of basic slag might be increased.

The Improvement of Low Grade Basic Slag

In his Paper on this subject, Mr. W. S. Jones said that the important question was the prevention of waste, more especially by the improvement of the grade. In this connection he proposed the following: (1) concentration methods by mechanical means, (2) manipulation methods, (3) direct enrichment methods by using phosphate rock, and (4) process methods. The latter were probably the most important and most generally effective.

PROFESSOR DONNAN said that the problem had resolved itself into a question as to how the steel makers were going to supply what the country required.

In the ensuing discussion several steel makers expressed their desire to do all they could to supply the needs of the country in this respect. They were all fully alive to the great importance of the basic slag question.

An interesting suggestion was put forward by Dr. Russell, that a committee of active people should be set up, consisting of steel makers and agriculturists, to see whether it was possible to carry on the subject to some practical outcome. It would be a pity if nothing practical emerged from the discussion.

Mr. WEAVER, of the Ministry of Agriculture, said that the Ministry would welcome the suggestion and would be pleased to help in any way possible.

After some discussion a resolution was passed to the effect that the Ministry of Agriculture be informed of the feeling of the meeting, and inviting the Ministry to take the matter up with the Iron and Steel Institute and arrange for the representation of the agriculturists and steel makers.

Chemical Industry Dinner at Newcastle.

The President's Visit.

MR. JOHN GRAY, President of the Society of Chemical Industry, and Dr. J. P. Longstaff, general secretary, were the chief guests at the annual dinner of the Newcastle Section on Thursday evening, March 18, when Professor P. P. Bedson presided over a gathering of between 40 and 50 members. During the evening it was announced that the following officers had been elected for the coming session: Chairman of the Section, Dr. J. H. Paterson; secretary, Mr. H. Dunford-Smith; treasurer, Mr. A. Trobridge; committee, Dr. J. T. Dunn, Dr. F. C. Garrett, Professor H. Louis, Mr. W. D. Jones, Mr. G. Weyman, Dr. J. Peile, Mr. A. Short, Mr. W. Diamond, Mr. A. Fletcher and Mr. W. Craggs.

Professor Bedson, in welcoming the guests, said the Society was to be congratulated on having a president who had been so honourably associated with an important branch of chemical industry as soap-making. Soap-making had obtained a good deal from chemistry, but it had returned a good deal and added to their knowledge of colloids and fats. The concern was not known only on account of the perfection of its products, but as an example of how it was possible to carry on an industry in such a way as to have participation of profits by the workers. At Port Sunlight they had a good example of that system. Port Sunlight had shown how the problem of housing the working classes could be solved, and how the workers could be given such social amenities as led to their general contentment which was a not unimportant factor in the difficulties of the labour question. Port Sunlight was a place of special interest to social economists. Referring to the history of the Newcastle Section he mentioned that before it was a section of the Society of Chemical Industry it was a separate society—the Newcastle Chemical Society—and had had many distinguished members. Since joining the Society of Chemical Industry in 1883 they had found three presidents for the Society—Sir Lothian Bell, Sir Joseph Swan and Professor Henry Louis. They had had three gold medallists—John Glover, Sir Joseph Swan and Sir Andrew Noble. (Applause.) He assured the guests that the Newcastle Section was fully alive to the work to be done by sections, and was in a healthy and vigorous condition. They yielded to no section in loyalty to the president and council. (Applause.)

The president, after warmly thanking the members for their greeting, said he was relieved to find on the authority of Professor Bedson that soap-making was really a chemical industry, as his firm had recently been refused permission to join an association of chemical manufacturers on the grounds that soap-making did not come under that head. That decision, however, was reversed. He thanked Professor Bedson for his appreciative references to the firm with which he was associated. He had personally found great pleasure in his work at Port Sunlight. It was thought by some people that it was a sort of philanthropy, but that was not so. It was a business proposition from beginning to end. It would be as bemeaning to them to offer philanthropy to their workers as for the workers to receive it. He was glad to be with them and to find the section in so healthy and active a condition. He referred to his position as president and paid a high tribute to the work of Professor Louis whom he had followed. He concluded by urging them to strive to increase the membership and so put the Society on a sound basis.

Professor Henry Louis, replying to the toast of Armstrong College with which his name had been coupled, said that whilst they did not manufacture chemicals at the College they manufactured chemists and never had the science classes been so well attended as this term. Unlike other branches of the chemical industry, they did not get such a liberal reception for their products. Chemists' salaries were far from what he thought they should be, but they were better than he had ever known them. He remembered being offered a position as works chemist as a young man at £80 a year. He had had the courage to refuse and tell the management that he could get as much as a blacksmith's striker. The nation was slowly awaking to the importance of the chemical industry, but it had not sufficiently awakened to realise that it owed a great debt to chemists and should pay a fair market price for their work. He believed in combined action by chemists to enforce a recognition by the nation of their right for higher remuneration. (Applause.)

Mr. A. Shortt proposed the health of Professor Bedson, who briefly replied.

Dr. F. C. Garrett proposed the health of the general and sectional secretaries. He said he could appreciate the excellence of the work done by Mr. H. Dunford Smith as he had been secretary for some years. He could see, better than anyone, how much better the work was done now.

Dr. Longstaff referred to the excellent place that Newcastle Section had always taken in the Society's work. He impressed upon them the necessity of continuing that work and increasing the membership.

Mr. H. Dunford-Smith, in replying to the toast, took the opportunity of reminding the members that there was still a very great margin to work on. They had a membership of 250, but there were 450 eligible members in the district altogether.

British Pharmaceutical Society

Papers before the North British Branch

AT a meeting of the North British Branch of the Pharmaceutical Society of Great Britain, held in Edinburgh last week, Mr. D. B. Dott, Ph.C., F.I.C., F.R.S.E., referred to his note on Opium Assay recently read before the Society, and supplemented it by giving the British official process modified so as to include certain features taken from other pharmacopœias and containing what he thought was an improvement on the Japanese method of purifying the morphinate of lime solution.

Action of Ether on Metallic Mercury

In a note on the above subject, also communicated by Mr. Dott, it was stated that ordinary ether was liable to contain small quantities of certain impurities, a fact which was recognised by the Pharmacopœia in describing two grades, *æther* and *æther purificatus*. For many purposes, as a solvent for instance, the ordinary ether was quite suitable, while the purified was to be preferred as an anæsthetic. The specific gravity was sufficient to guard against any considerable amount of alcohol or water, although the bisulphide of carbon test was usefully applied when freedom from water was specially desired. Tests were given to exclude more than traces of aldehyde and peroxide. This latter was formerly assumed to be hydrogen peroxide but was now said to be ethyl peroxide. The liberation of iodine from potassium iodide was the test now relied on to indicate presence of peroxide. As regards the action of ether on mercury, it was found that pure ether had no action on the metal, while ether which indicated peroxide invariably reacted, causing formation of a dark-coloured film, and resulting in the formation of minute globules mixed with a grey powder when the metal and ether were shaken together. When ether containing much peroxide (the so-called ozonic ether) was employed, not only was the grey powder formed but also a certain amount of yellow mercuric oxide. On decanting the ether from the grey powder and treating the latter with a solution of citric and acetic acids, a solution was obtained which gave strong mercury reactions with sulphuretted hydrogen, stannous chloride, and hypophosphorous acid. The reactions might be said to indicate a mixture of mercurous and mercuric salts. There could be little doubt that the value of ether in aiding the complete mixing of the mercury with the chalk in making "grey powder" was due to the presence of an oxidising impurity in the ether usually employed. Pure ether could not possibly have the same effect. Admitting that a very slight oxidation took place when mercury and chalk powder were made in the ordinary way, it would obviously be very inadvisable to increase indefinitely the proportion of oxide by the use of ether containing an unknown percentage of peroxide. The only safe plan would be to use an ether which gave no reaction at all with the mercury, and such an ether would probably be found of no value for the purpose intended, or of so little value as scarcely to justify its use.

Chloroform From Coke Oven Gas

Mr. A. J. Dey, in a note on a sample of chloroform from coke oven gas, referred to recent reports of the production of ethyl alcohol as a by-product from coke oven gas. The interest regarding this sample was the fact that it was described as chloroform from coal gas, or more correctly from coke oven gas. This sample was produced as a by-product in connection with the works of the Skinning Grove Iron Co., and it was through the courtesy of Sir John Cowan, D.L., that the specimen was now exhibited. There was nothing new in making chloroform from ethyl alcohol, but this specimen was interesting as being the first that had been seen made from ethyl alcohol obtained as a waste product from coke oven gas. The coke oven gas contained ethane which, under ordinary conditions, was simply consumed in the combustion of the gas. By suitable arrangements, however, the ethane might be removed from the gas before it reached the burners. From this ethane as a starting point ethyl alcohol was obtained, and from the ethyl alcohol the chloroform was produced by the usual well-known process. On examination the sample responded to all the recognised tests for pure chloroform of the British Pharmacopœia with the exception that when evaporated there remained a characteristic odour which was reminiscent of an odour not infrequently observed in dissolving metallic iron in a dilute mineral acid. It was found that the sample could be freed from this impurity by treatment with sulphuric acid. This must be regarded merely as an experimental sample. It was hardly likely that coke oven gas would become a source from which to manufacture chloroform, though it seemed likely to be a commercial source for the production of ethyl alcohol for industrial purposes.

A Paper on "Protoiodide of Mercury" was communicated by Mr. J. Rutherford Hill, Ph.C.

AN ITALIAN SYNDICATE has been formed to exploit a patent which by a modification of the carburetter will enable nitrogen to be used instead of petrol. An experiment with a 25-35 H.P. car showed that over a course of 60 kilometres in one hour the expenditure did not exceed 53 c., or at the present rate of exchange 2¾d.

Petroleum Technologists' Annual Dinner

SIR FREDERICK BLACK presided at the annual dinner of the Institution of Petroleum Technologists at the Connaught Rooms on Tuesday, when the importance and present difficulties of the oil industry were dealt with in speeches by Mr. Walter Long, Sir Charles Greenway, Sir Hamar Greenwood, General Sir John Cowans, Sir Marcus Samuel, the Hon. Clive Pearson, Sir John Cadman and Sir Arthur Duckham.

Sir Marcus Samuel, responding to the toast of "The Petroleum Industry," submitted by the chairman, said that he had frequently applied to the Government for support, but never once for financial help. He believed the great industry they represented would be built up by individual energy and enterprise, and the less Government support there was, financially or by management, the more successful would the industry be. The heads of the petroleum companies were fully alive to the necessity of making good their case for the advance in price. He realised that in times of public passion and public temper, even when illegitimately aroused, there was a danger, and he was glad to assure the gathering that the accusations that had been made had no foundation whatever in fact. It was a most unfortunate period they had entered on, when committees were appointed and could make accusations against individuals or groups without giving them an opportunity of cross-examining the evidence upon which the accusations were made. It had been necessary to make a declaration—and he would appeal to his many friends at that gathering and ask them if he would be a party to an untruth—and he could tell them that there was no ring and no trust in the petroleum trade. The law of supply and demand was absolutely exemplified. A dangerous agitation had been started. The petroleum companies could look after themselves, but it was criminal to disseminate statements that could only arouse the animosity and greed of those who required a necessary of life at a price at which it was impossible to supply it. "If my company," said Sir Marcus, "had to supply petrol at the price the Profiteering Committee lays down that it ought to supply it, there would be an actual loss of £1,600,000. You can scarcely expect any company to face such a loss as that. You cannot expect them from profits derived elsewhere to subsidise the European trade." Referring to the question of Empire supplies, Sir Marcus said it was no use crying for the moon. If there were no oil properties within the Empire they might be extremely thankful that the British financier developed them elsewhere. The want of tonnage was a great factor in dealing with the enormous demand. The tonnage required to keep Egypt in liquid fuel was more than the whole tonnage required by the Shell Company before the war. The price of petrol was lower in England than in any country in Europe. He was optimistic for the future. Supply, he thought, would overtake demand, provided those qualified were left alone and not hindered. They were twitted about their profits, but for every oil company that was successful a hundred never reached the dividend stage.

Electrolytic Alkali and Chlorine Industry

THE second lecture of the series of three on this subject was delivered by Mr. J. B. C. Kershaw at the College of Technology, Manchester, on Thursday, March 16, and dealt with the development of the electrolytic alkali and chlorine industry on the Continent of Europe. The war and its after results had made it impossible to obtain much recent information concerning the present position of the industry in Europe. Many of the chemical works and plants in Russia and Austria which were promoted and erected in the years 1900-1910, by German electrical engineering companies, had been compelled to cease work; and where they had been maintained in operation the object had been to produce chlorine gas for the purpose of the war. The facts and figures given, therefore, referred chiefly to the pre-war position; and only in the case of the French works had it been possible to obtain more recent information.

The following cells were then described with the help of lantern slides, and details were given concerning the various works in Germany, Austria, France, Switzerland, Italy, Belgium and Russia, in which the cells named had been or were now being used for the production of caustic alkali and chlorine by the electrolysis of brine solutions:—

Germany	The Griesheim "Elektron" cell.
	The Billiter-Siemens cell.
Austria	The Aussig-bell cell.
	The Billiter-Leykam cell.
	The Kellner-Mercury cell.
France	The Outhenin-Chalandre cell.
	The Soc. L'Industrie Chimique à Bale cell.
Belgium	Solvay-Mercury cell.

A series of lantern slides, illustrating the electrolytic chlorate factory of Corbin and Cie at Chedde in the Hte. Savoie, were shown at the conclusion of this lecture.

PLANS HAVE BEEN APPROVED by the Scalcoates (Hull) Rural Council for a petroleum installation at Salt End, on the Humber, estimated to cost £100,000.

New Committees of the S.C.I

IT is announced in the current issue of the *Journal* of the Society of Chemical Industry that the Council has approved the President's scheme for the appointment of the following standing committees (with the President and Hon. Treasurer as ex officio members):—

FINANCE COMMITTEE.—Messrs. C. C. Carpenter (convener), E. F. Armstrong, J. L. Baker, E. V. Evans, C. S. Garland, H. Levinstein, R. Messel, W. F. Reid and E. Thompson.

GENERAL PURPOSES COMMITTEE.—Messrs. S. Miall (convener), C. C. Carpenter, F. H. Carr, W. R. Hodgkinson, H. Louis, G. T. Morgan, L. Guy Radcliffe, A. Rée and E. Walls.

PUBLICATIONS COMMITTEE.—Messrs. E. V. Evans (convener), E. F. Armstrong, W. J. A. Butterfield, C. C. Carpenter, F. H. Carr, J. W. Hinchley, W. R. Hodgkinson, C. A. Keane, A. R. Ling, R. Messel, W. F. Reid and E. Thompson.

TRANSACTIONS AND ABSTRACTS SUB-COMMITTEE.—Messrs. J. L. Baker, E. R. Bolton, W. J. A. Butterfield, C. C. Carpenter, F. H. Carr, C. F. Cross, J. T. Dunn, E. V. Evans (chairman), J. W. Hinchley, W. R. Hodgkinson, E. Grant Hooper, C. A. Keane, A. R. Ling, H. Main, G. T. Morgan, R. Messel, H. R. Procter, W. J. Rees, W. F. Reid, Watson Smith, L. T. Thorne and W. G. Wagner.

REVIEW SUB-COMMITTEE.—Messrs. E. F. Armstrong, R. Brown, W. J. A. Butterfield, C. C. Carpenter, E. V. Evans, C. A. Keane (chairman), A. R. Ling, R. Messel, E. Thompson and W. G. Wagner.

ANNUAL REPORTS SUB-COMMITTEE.—Messrs. W. J. A. Butterfield, C. C. Carpenter, E. V. Evans (chairman), W. R. Hodgkinson, E. G. Hooper, A. R. Ling and G. T. Morgan.

LITERARY AND LIBRARIES COMMITTEE.—Messrs. W. J. A. Butterfield (convener), P. P. Bedson, A. G. Bloxam, A. Holt, R. L. Mond, G. T. Morgan, H. Talbot, J. Walker and L. P. Wilson.

GOVERNMENT AND PARLIAMENTARY COMMITTEE.—Messrs. W. F. Reid (convener), J. L. Baker, W. A. Bone, C. S. Garland, A. R. Ling, W. McD. Mackey, S. Miall, A. Rée, and Sir Robt. Hadfield.

TECHNICAL, RESEARCH AND ALLIED SOCIETIES COMMITTEE.—Messrs. C. A. Keane (convener), J. Allan, P. P. Bedson, W. A. Bone, J. W. Cobb, J. W. Hinchley, A. Holt, D. S. Jerdan, H. Levinstein, H. Louis, F. R. O'Shaughnessy and W. J. Rees.

Society's Representatives on Outside Bodies

Federal Council for Pure and Applied Chemistry: The President Dr. C. A. Keane and Dr. S. Miall.

National Physical Laboratory (General Board): Dr. E. F. Armstrong and Prof. F. G. Donnan.

Conjoint Board of Scientific Societies: Dr. A. Holt and Dr. C. A. Keane.

British Empire Sugar Research Association: Mr. A. R. Ling and Mr. J. W. Macdonald.

Institute of Chemistry Standards Committee: Dr. A. Holt, Mr. A. R. Ling and Mr. W. G. Wagner.

British Association Fuel Economy Committee: Mr. E. V. Evans.

Industrial Alcohol Joint Committee: Dr. E. F. Armstrong and Mr. D. Lloyd Howard.

The British Dye Industry Committee of the British Science Guild: Mr. E. V. Evans.

British Engineering Standards Association: Aircraft Sub-Committee on Chemicals: Prof. W. A. Bone; Sub-Committee on Textiles: Mr. C. F. Cross; and Sub-Committee on Dopes: Mr. J. F. Briggs.

The Imperial Mineral Resources Bureau: Lead, Silver, Zinc and Cadmium Sub-Committee: Mr. H. M. Ridge; Aluminium, Magnesium, Potassium and Sodium Sub-Committee: Dr. R. Seligman; Minor Metals Sub-Committee: Mr. W. G. Wagner; Chemical Industries Sub-Committee: Sir R. A. Hadfield, Bart.; Publications and Libraries Sub-Committee: Mr. W. J. A. Butterfield; Abstracts Sub-Committee: Prof. H. Louis and Mr. T. F. Burton.

THE COUNCIL of the Society of Chemical Industry have decided to publish a fourth volume of their "Annual Reports on the Progress of Applied Chemistry," covering the year 1919. The reports take the form of monographs written by experts in the various branches of chemical technology. The writers, in the first place, aim at presenting an accurate and complete account of progress achieved; and, in the second, they seek to present a well-balanced survey, throwing the events they record into proper perspective, and, where occasion requires, interpreting them in the light of their individual experience. Volume IV. is to be published during the current month. As a preliminary to the issue of the new volume, short summaries of some sections dealt with will be published immediately in the Society's "Journal." An important contribution has been made by Sir Dugald Clerk, in collaboration with Professors Smithells and Cobb, which presents a careful and comprehensive analysis of the thermal efficiency of the carbonisation process; comparisons have been drawn between the efficiency of the coal carbonisation process and of other methods of producing light, heat or power. Emphasis is placed upon the value of the chemical by-products obtainable from gas.

Acid Resisting Materials

Exhibition and Conference at the Liverpool Section

An exhibition of Acid Resisting Materials, followed by a conference of the same subject, was held on Friday, March 19, by the Liverpool Section of the Society of Chemical Industry at the Royal Institution. The exhibition comprised a very representative collection of samples and the papers read at the conference were contributed by the firm's exhibiting, who were nominally allowed 10 minutes each.

Among the more important exhibits were those of:

Meldrums, Ltd., Tank plates, Acid Impeller, Steam Jet Elevator Cover.

G. & J. Weir, Ltd., Monel Metal.

Buckley Brick and Tile Co., Charles Davison & Co., Ltd., Withem Brick and Tile Co., Ltd., Accrington Brick and Tile Co., Ltd.: Acid Resisting Clays, Bricks for all Purposes, and Special Devices and Fittings.

T. & C. Clark & Co., Ltd. (the oldest firm of producers of acid resisting enamel ware): Vessels for Research work, Steam Gathered Pans, Still Apparatus, Agitators, Rectangular Tanks, Autoclave Linings, Conveyor Pipes.

Lennox Foundry Co., Ltd.: Tantiron Fittings.

Haughtons Ltd.: Ironac.

Thermal Syndicate, Ltd.: "Vitreosil."

The United Alkali Co., Ltd.: Duroprene: a valuable and resisting varnish.

United Water Softeners, Ltd.: "Filtros" Porous Plates.

Some of the Papers were illustrated with lantern views, and in the ensuing discussion the Papers were taken in groups, and many points of interest to users and makers were dealt with.

The exhibition appeared to attract a considerable amount of interest, and a suggestion was made that other sections might follow suit.

Sir John Cass Technical Institute.

On Saturday, March 20, the third annual dinner of the metallurgy department of the Sir John Cass Technical Institute was held at Slaters' Restaurant, Bishopsgate.

Mr. G. Patchin, A.R.S.M., head of the department, was in the chair, supported by Mr. C. O. Bannister, A.R.S.M., Dr. Charles A. Keane, the Principal, and the members of the staff of the Institute. About 80 past and present students of the metallurgy department and their friends were present.

Mr. W. L. Allen, in proposing the toast of the Sir John Cass Technical Institute, referred to the great benefit conferred on the community by the establishment of this centre for technical education and remarked that if the founder could see the results of his beneficence and foresight he would be highly gratified.

Dr. Keane, in reply, stated that at the present time there were over 1,000 students attending the various courses. In 1904 there were three courses and 22 students in the metallurgy department, and this year there were 11 courses and 120 students.

The toast of the metallurgy department was responded to by Mr. G. Patchin and Mr. C. O. Bannister, the past and present heads of the department. Both referred particularly to the very cordial relationships existing between the members of the staff and the students, and expressed their appreciation of the loyal service rendered by their colleagues. Musical items were rendered during the course of the evening by several of the guests.

Recent Wills

Mr. C. E. Groves, F.R.S., of Kennington Green, S.E., for some years lecturer in Chemistry at Guy's Hospital, and consulting chemist to the Conservators of the River Thames (net personalty, £32,857). The testator gives the executors £20,000 in trust for his five sisters for life, and on the death of the survivor of them £10,000 to the Royal Institution, Albemarle Street, W., for the Groves Endowment Fund for the promotion of scientific research £33,022

Mr. T. Liversidge, of Huddersfield, and of Tom Liversidge & Sons, Ltd., dyers £21,230

Mr. P. Gilston, of Hunslet, Leeds, glass bottle manufacturer £19,460

Mr. H. E. Stoner, of Walton-on-Thames, managing director of the Vacuum Oil Co. £7,363

Mr. J. M. While, M.I.C.E., of Windermere, formerly of Whimsfield, Barrow-in-Furness, iron and steel works manager, lately a director of the Barrow Hematite Steel Co., formerly manager to Bolckow, Vaughan & Co., later with the Dowlais Iron Co., and general manager of the Darlington Iron & Steel Co., the inventor of the present method of rolling tram rails £58,578

Mr. J. S. Ferguson, of Thornton Hough, Chester, formerly a director of Lever Brothers, Ltd. £20,580

Chemical Trade Inquiries

Locality of Firm or Agent.	Materials.	Ref. No.
Canada	(1) Bending Art Glass; (2) Tallow for Soap-making; (3) Glass Circles; (4) Artificial Silk. (Replies to the Office of the High Commissioner for Canada, 19, Victoria Street, S.W.1.)	...
British West Indies (Port of Spain, Trinidad)	Glass	359
Egypt (Egyptian War Dept.)	Oils and Paints. Particulars from Sir A. L. Webb, K.C.M.G., Queen Anne's Chambers, Broadway, Westminster, S.W.1.	...
Iceland (Reykjavik)	Paints and Varnishes	367
Norway (Christiania)	Linseed Oil	377
Switzerland (Berne)	Chemical Products	...
America ...	Heavy Chemicals	426
New York ...	Chemicals, Fertilisers	422
Denmark ...	Chemicals	402
Montreal ...	Chemicals, Dyestuffs, Paint and Varnish Makers' Supplies ...	392
Nantes	Drugs	404

A firm of mining engineers at Vancouver, B.C., desire to get into touch with United Kingdom firms likely to be interested in molybdenum properties in Canada.

H.M. Commercial Secretary at Washington reports that an American firm is desirous of entering into communication with United Kingdom manufacturers who are in a position to offer ferrotungsten, tungstic acid, and other tungsten compounds, and that it would be glad to receive quotations accompanied by chemical analyses and other appropriate details, together with small samples of some of the powdered substances. It is stated that the firm in question are apparently experiencing some difficulty in obtaining tungsten suitable for use in the manufacture of filament lamps in the United States. They purchase annually approximately 300,000 lb. of tungstic acid, and, provided the prices and analyses coincide with their requirements, they might be prepared to place orders in this country to the value of some £200,000 annually. Delivery would be required to commence not earlier than August or September next.

The British Chemical Trade Association.

The Association has been advised by the Department of Overseas Trade, 35, Old Queen Street, S.W.1, that the representative of a Chilean firm, who is at present in the United Kingdom, desires to get into touch with firms who can supply Chemicals for industrial purposes; medicines and drugs. The above firm are stated to be importers and have a good commercial reputation. Members interested should communicate with the Department of Overseas Trade. (Ref. No. D.O.T. 18549/S.C.(1).)

The Association has received, through the Department of Overseas Trade, inquiries from firms in Reval and Wesenberg, Esthonia, for Chemicals and Sulphur.

The Commercial Secretary, H.M. Legation, Havana, desires that firms interested in that market should furnish him with copies of their catalogues or other trade literature published by them.

Inquest on Chemical Worker

An inquiry which took place last week into the circumstances attending the death of Joe Thwaites (60), chemical charge-hand at British Dyes, Ltd., Huddersfield, showed that death was due to natural causes. Thwaites was employed in No. 52 Department, nitro-chlor-benzol, and on going home on January 30 said he felt as though he had had a severe attack of gas. The next day he had to remain in bed, and stayed there until he died on Saturday, March 13. In the course of the evidence it was stated that Thwaites was a charge hand in the nitro-chlor-benzol department and had to charge the stills by means of a flexible pipe. The sump was covered by a wooden lid. Both the stills and the receivers were covered, a hole about six inches square admitting the flexible tube. Occasionally there were fumes in the department. The smell, unless there was steam about, was not particularly obnoxious. Medical evidence indicated no signs of chemical poisoning.

It was suggested that in cases where a man was transferred from one department to another, as in this case, he should be medically examined. Mr. Peacock (H.M. Inspector of Factories) said the Board of Trade regulations provided for medical examination of men employed as Thwaites was once a month, but at British Dyes such examination took place weekly.

Chemical Matters in Parliament

Anglo-Persian Oil (18/3/20)

Viscount Curzon asked the Prime Minister the terms of the contract under which the Anglo-Persian Oil Co., in which the British Government had a controlling interest, agreed to supply the Shell Oil Co. with its produce until the end of the year, 1922 ?

Sir H. Greenwood : I regret that I am unable to disclose the terms of commercial contracts entered into by the Anglo-Persian Oil Co. This particular contract was concluded in 1912 before the Government acquired an interest in the company.

Viscount Curzon : Have the Government an interest in this company, and, if so, is not the House entitled to know what the interest is ?

Sir H. Greenwood : The Government have a predominating interest in the Anglo-Persian Co., holding two-thirds of the ordinary shares, besides debentures. The Government does not interfere with the commercial arrangements of the company and will not unless, which, of course, will never happen, they are antagonistic to the interests of the British Empire.

Mr. Macquisten : Will the hon. Baronet lay before the House the various other contracts which the Anglo-Persian Co. have, so that comparisons may be made to see where we stand ?

Sir J. D. Rees : Is it not the case that when the contract was entered into there was absolutely no other means of marketing the oil which was so much required ?

Sir H. Greenwood : The answer to the second supplementary answer of the hon. gentleman (Sir J. D. Rees) is, in the main, correct. The Government took control over the company in 1914 and agreed that it would not interfere with the commercial contracts of the company ; therefore, I am not in a position to disclose them.

Petrol Importation (Belgium) (18/3/20)

Mr. Macquisten asked the Prime Minister whether the British Government, in establishing depots and undertaking the importation, through the British Petroleum Co., of petrol and petroleum products into Belgium, were doing this as part of the consideration paid to Mr. Joseph Waterkeyn for withdrawing his objection to the taking over of the interests of the French, Russians, and his own holdings in the British Petroleum Co. ; was it the intention of the British Government to employ their steamers to supply the Belgian market ; and would he state how this was going to benefit the consumers in Great Britain, seeing that it would further decrease the already short supply of tonnage ?

Sir H. Greenwood : The answer to the first part of the question is in the negative ; in regard to parts 2 and 3, there is no intention of using Government-owned vessels in this trade. As regards the vessels of the British Petroleum Co., it is not proposed, and would be contrary to the arrangements between the Government and the Anglo-Persian Co., to place any such restriction on the use of their tonnage as suggested by the hon. Member. There is no reason to anticipate that the provision of tonnage required to maintain supplies to this country will be in any way affected.

Mr. Macquisten : Are not the tank steamers belonging to the Anglo-Persian Oil Co., of which the Government is the principal proprietor, being used for the purpose of supplying the Belgian market, and so hampering the British supplies ?

Sir H. Greenwood : The first part of my answer was in the negative. As to the other portions of the answer, only one steamer has gone to Belgium with oil, and that went only because there was no storage in the tanks in this country at the time.

Irish Sugar Beet Cultivation (18/3/20)

Capt. Redmond asked the Vice-President of the Department of Agriculture (Ireland) to state what steps, if any, had been taken by the Department to introduce and encourage the growing of sugar-beet as part of the crop rotation system in Ireland ; whether the exceptional geographical position of Ireland, with its excellent climatic conditions and generous soil, constituted an ideal condition where sugar-beet growing might attain its greatest perfection in development and yield of sugar content ; whether its cultivation, meaning a yearly increase in other crops following in rotation, would prove a potential factor in solving the scarcity of food problem ; whether, under the system, potato production would exceed the normal requirements and the surplus be available for the distillation of industrial alcohol ; whether the beet growers of England were supported by Government assistance, though that country possessed no natural advantages over Ireland ; and whether he was prepared to introduce a Departmental scheme, with Government subsidies attached, to inaugurate beet growing on a substantial scale in Ireland ?

Mr. Macpherson : I will have the answer published in the *Official Report*.

International Opium Convention (18/3/20)

Mr. Shortt stated, in reply to Mr. Gilbert, that he could not name the exact date on which the Bill, prepared to give effect to the pharmacy legislation necessitated by the International Opium Convention and the provisions of Article 295 of the Treaty of Peace, would be introduced, but he hoped it would be within a very short time.

Courtaulds' Profits (22/3/20)

Mr. Lunn asked the President of the Board of Trade whether he was aware that Courtaulds, Ltd., silk manufacturers, made profits in 1919 amounting to £2,280,861, after provision for depreciation and taxation, representing 57 per cent. on the company's capital ; and whether any inquiry was being made by the Central Profiteering Committee into the silk trade ?

Mr. Bridgeman : I am aware of the facts stated in the first part of the question. At present no investigation into the silk trade is being made by the Central Committee.

Mr. Pemberton Billing : Will the hon. gentleman give an assurance that in cases where 57 per cent. profit was made, they will note it ?

Mr. Bridgeman : The House must not take it that it is not the intention of the Committee to investigate. All I have said is that no investigation has yet taken place. They are very full of work at present. No doubt the matter will be brought before their notice.

Lieut.-Commander Kenworthy : Is it the intention to investigate ?

Mr. Bridgeman : I cannot say what the intention of the Committee is, but their attention will certainly be called to these questions, and they will certainly take notice of them.

Importation of Dyestuffs (22/3/20)

Mr. Bridgeman, in reply to Mr. Waterson, stated that there was no prohibition on the import of dyestuffs into this country.

Munitions: Potash Production Branch (22/3/20)

Sir R. Cooper asked the Parliamentary Secretary to the Ministry of Munitions if Mr. Arthur Blok, of the potash production branch, was a naturalised subject ; and, if so, where was he born and when were his naturalisation papers taken out ?

Mr. Bridgeman : I have been asked to reply. As I have already stated, Mr. Arthur Blok is a natural born British subject, and his place of birth was Stoke Newington, London. I strongly deprecate these personal attacks on an officer who has rendered valuable service in Departments of the Government, both before and throughout the war.

Petrol (22/3/20)

Capt. Tudor Rees asked the Prime Minister what steps he proposed to take to give effect to the report of the Profiteering Committee that the present price of petrol was excessive and without justification ?

Mr. Bridgeman : The Board of Trade propose to discuss further with the companies the various items of cost to which the Sub-Committee call attention, but even if it were found possible to effect a temporary reduction, I think we must face the fact that the demand for motor spirit is growing more rapidly than the supply, and that short of a complete international control, which is hardly a practical proposal, the most effective method of preventing an increase of price is the use of other forms of liquid or gaseous fuel. The Board of Trade are examining the various possibilities with the assistance of the Fuel Research Board. There are difficulties in the way of an extended use of gas, particularly the fact that supplies of town gas are not too plentiful. I hope that it will be possible in due course to increase the production of benzol ; but this, again, will be a limited quantity. The greater use of alcohol is no doubt one remedy, but a good deal of research, both as to possible sources of supply and the provision of a cheap and efficient denaturant, will be needed, and it will, I fear, in any case be a long time before large quantities can be expected to be available.

Mr. Bridgeman, in reply to Sir J. D. Rees, stated that the offer made by Mr. Deterding on behalf of the Royal Dutch Shell Group would not be lost sight of, and advantage would be taken of it should occasion arise.

Cordite (22/3/20)

Sir A. Warren asked the Parliamentary Secretary to the Ministry of Munitions, in view of the announcement of the Government's intention in relation to the Royal Gunpowder Factory, Waltham, what was likely to be the future amount of cordite required by the Government ?

Mr. Kellaway : I regret that I am not in a position to give the estimate.

Nigeria & Tarkwa Mines, Ltd.

In the Companies Winding-Up Court on Wednesday, Mr. Justice P. O. Lawrence made an order for the compulsory winding-up of the company, on the petition of the Economic Discount Co., Ltd.

King Asbestos (Rhodesia), Ltd.

Mr. Justice P. O. Lawrence on Wednesday made an order extending the time in which to register a mortgage for 21 days from the date of the order. Counsel said that the company owned asbestos properties in Rhodesia and had executed a deed of hypothecation in favour of the Standard Bank of South Africa to secure £15,000. A copy was sent over here, but was not certified in the way required by the Registrar in this country.

From Week to Week

SIR MARCUS SAMUEL, the Chairman of the great petrol combine, has given £25 000 from the combine, and £1,000 personally to the Ex-Officers Association.

BARON PALMEN, director of the Central Chemical Research Laboratory for Finnish Industry, is at present on a visit to London on an important trade mission.

AT THE ANNUAL MEETING of the Council of the Institute of Journalists, Mr. F. E. Hamer (THE CHEMICAL AGE) was re-elected a member of the executive for the ensuing year.

BRITISH CHEMICAL trade employers have agreed to go to arbitration on the question of the workers' demands for an advance of 10s. a week, and minimum rates of 1s. 6d. an hour for day workers, and 1s. 8d. for process workers.

THE DEGREE COMMITTEE of the Special Board for Physics and Chemistry at Cambridge University are of opinion that the work submitted by P. W. Burbidge, of Trinity, and A. R. McLeod, of Caius, is of merit of original research.

SOME INTERESTING DISCLOSURES regarding Government trading and Government profiteering are made by Mr. Boyd Cable in an article on the question of the high cost of living, and especially of food, which appears in the current issue of *Ways & Means*.

FROM MARCH 25 the addresses of all the following companies have been changed to 52, Grosvenor Gardens, S.W. 1 (Telephone, Victoria 9272): The Woodall-Duckham Vertical Retort & Oven Construction Co., Ltd., Arthur Duckham & Co., Ltd., Woodall, Duckham & Jones, Ltd., Thermal Industrial & Chemical (T.I.C.) Co., Ltd., and The Liquid & Solid Fuels Co., Ltd.

THE FOURTH great combine for the mass production of glassware by machinery is announced to take place in a few days. The capital will approximate £1,000,000, and five Midland firms and others at Sunderland and Gateshead will be included in the arrangement. The new concern will concentrate on the production of table ware, particularly tumblers and wine-glasses, of which there is a world shortage.

WITH REGARD TO the propaganda conducted by the Ministry of Agriculture for the destruction of rats, it is announced that the Treasury has sanctioned the establishment of a research laboratory, and that a chemist is to be appointed to work in conjunction with the Ministry's technical adviser. The work will include the discovery of new poisons that are harmless to domestic animals, as well as the improvement of existing poisons.

THE CELLULOID COMPANY of New York claims to have perfected a synthetic substitute to take the place of camphor in the manufacture of motion picture films. The substitute, it is stated, will eliminate much of the inflammable nature of the film. It is believed that the manufacture of this material in commercial quantities will eventually make American producers independent of the Japanese camphor monopoly, which has cut its allotment to the United States for the y ear 1920.

PRINCE ARTHUR OF CONNAUGHT presided last week at a luncheon, at the Savoy Hotel, held in order to explain the scheme of the University College, London, to enlarge and equip its engineering school. For this purpose the sum of £100,000 is required and among the donations announced at the luncheon were £1,500 from the Anglo-Mexican Petroleum Co.; £1,000 from the Anglo-Saxon Petroleum Co.; £500 from the Anglo-Persian Oil Co.; and £250 from the British Petroleum Co.

THE OLDHAM EDUCATION COMMITTEE have approved of a scheme for the provision of six scholarships of £100 each, to enable promising students to be trained to undertake research work in connection with the British Cotton Industries Research Association. The Scholarships will be tenable at an approved University or at the Manchester College of Technology for a period of three years, and holders will be required to take a graduate course in science or technology, and they must devote their whole time to the course of study.

AT THE FIRST MEETING of the Joint Industrial Council for the glass manufacturing industry (exclusive of plate and sheet glass), held at the Ministry of Labour recently, Mr. J. Donaldson Harward, of the British Flint Glass Manufacturers' Association, was appointed chairman, and Mr. T. Thompson, of the National Federation of Glass Bottle Workers, vice-chairman. An executive committee was appointed, to which was referred the consideration of the appointment of sectional councils for each branch of the industry.

THE DISASTROUS EXPLOSION in Halifax Harbour on December 6, 1917, when a large part of the city and the town of Dartmouth were devastated and 1,700 persons lost their lives, was recalled on Monday before the Judicial Committee of the Privy Council. The disaster was caused by the blowing up of the French steamer Mont Blanc, which was loaded with picric acid, T.N.T., benzol and gun-cotton belonging to the French Government, as the result of a collision with the Belgian relief ship Imo, and their Lordships were called upon to decide which ship was to blame. In a long judgment they upheld the view taken by the Supreme Court of Canada that both ships were equally to blame.

DR. W. R. ORMANDY, in an address on the liquid fuel problem at Olympia last week, advocated the claims of alcohol to meet the present shortage of petrol. Alcohol, he said, was a fuel that could be produced economically in a tropical country like British East Africa, and it could be easily conveyed to this country. Mr. Lloyd George had stated in the House of Commons recently that the question was being considered by a departmental committee of experts, but since then the question had been bandied about from one body to another without any satisfactory result. Most important was it, therefore, that those most interested should be prepared to act on their own initiative. If they left the matter to the Government, nothing would be done.

AT A MEETING of the Sheffield section of the National Association of Industrial Chemists last week, Mr. T. F. Russell, Assoc. Met. (of Steel, Peach & Tozer), lectured on "The Mechanical Testing of Steel." He remarked that the most difficult problem engineers and metallurgists had to face was that of determining the absolutely safe limits or working stress, in order that they might use the minimum quantity of weight. The whole theory of structures depended on the theory of elasticity, which presupposed homogeneity and isotropy, whereas steel was a heterogeneous conglomerate whose constituents had different mechanical properties. Mr. Russell dealt with the principles of all the mechanical tests, especially the tensile and alternating stress tests, and also demonstrated several extensometers.

AT BOW STREET POLICE COURT on Tuesday, Mr. Graham Campbell delivered a considered judgment in the case in which Genatosan, Ltd., of Chenies Street, W.C., were summoned for buying milk wholesale from six different farmers in Cornwall at prices in excess of that fixed by the Milk (Summer Prices) Order, 1919. The Magistrate said that the defendant company were the owners of a factory near Penzance, where they manufactured the patent food "Sanatogen." They had been in the habit of obtaining large supplies of milk from local farmers, paying for it in accordance with an old-established custom at so much for the butter fat and so much for the skimmed milk, the two prices added together being in excess of the controlled price for new milk. He had come to the conclusion that an offence had been committeed against the Order. He had no reason to think that the company had endeavoured to mislead the officials of the Food Ministry. On the one summons which had been gone into he imposed a penalty of £10. The defendants were ordered to pay 25 guineas costs. The remaining five summonses were withdrawn.

AS THE RESULT of an inquiry into the costs of and profits realised on aspirin tablets, the Sub-Committee appointed under the Profiteering Act to investigate the prices of drugs and medicinal preparations find that the retail charges for certain brands of tablets are excessive in relation to the cost of manufacture. They state that under present conditions aspirin tablets made from acetyl salicylic acid, which answers the tests demanded by the British Pharmacopœia can, when working with large quantities, be manufactured and sold by the manufacturer, with a reasonable profit to him, at 5s. 6d. per dozen screw-capped bottles of twenty-five five-grain tablets in each bottle. Aspirin in five-grain tablets packed twenty-five in a bottle can at present be purchased by the public at certain shops at about 6d. per bottle. This price means a very narrow margin of profit to the retailer, but on the other hand the retail price of 1s. and upwards (for twenty-five tablets) at which certain brands are sold is excessive in relation to the cost of manufacture, even when due allowance is made for charges incurred in advertising and other methods of gaining publicity. In the Sub-Committee's view a charge of 10d. per bottle of twenty-five five-grain tablets, if properly apportioned between the various interests, gives a reasonable profit to the manufacturer, the wholesaler, and the retailer.

AN IMPORTANT SCHEME is being promoted to found an Animal Nutrition Research Institute at Aberdeen, in association with the North of Scotland College of Agriculture. The capital expenditure of the scheme, which will have its headquarters at Craibstone, near Aberdeen, is from £40,000 to £50,000. Of this, the Government will contribute half, provided the other half is raised independently. Mr. J. Q. Rowett, of London, has given a donation of £10,000. It is intended, when the Institute is established, that investigations shall be carried out to determine the net productive value of feeding stuffs at present in use, and to test the feeding value of certain materials not at present used, and find out whether some which cannot be used in their crude state, could be so treated as to make them usable. Work will also be undertaken to determine the most economical methods of handling and feeding farm animals, and to increase our knowledge of the digestive processes. Problems of heredity will not be dealt with as such, but many of the problems of the breeder are problems of nutrition, and a solution of these will be attempted. The main building will provide a series of fully equipped laboratories and experimental stalls. The other part of the station will consist of grazing ground and model animal houses, with accessory buildings.

References to Current Literature

Only articles of general as distinct from specialised interest are included and given in alphabetical order under each geographical subdivision. By publishing this digest within two or three days of publication or receipt we hope to save our readers time and trouble; in return we invite their suggestions and criticisms. The original journals may be consulted at the Patent Office or Chemical Society's libraries. A list of journals and standard abbreviations used appeared in our issue of December 27 last.

British

ANALYSIS. Analysis by X-rays. *Engineering*, March 19, 365-366. An account of the work of W. H. & W. L. Bragg in this field.

ETHYLENE. The chlorination of ethylene in the presence of calcium chloride. J. A. Smythe. *Gas J.*, March 23, 691-693. The preparation of chloroethanes and glycol is described.

GAS. Oxide purification. G. W. Anderson. *Gas J.*, March 23, 688-690. A useful account of some works' experiences.

LIME LIQUORS. The analysis of lime liquors. D. Burton. *J. Soc. Leather Trades' Chem.*, February, 32-44. A report of the Committee on Limeyard Control of the Society.

TRANSPORT. English canals and inland waterways. S. Preston. *J. Roy. Soc. Arts*, March 19, 279-298. A useful contribution to the subject.

Colonial

BOILERS. Results of forty-one steaming tests conducted at the Fuel Testing Station, Ottawa. J. Blizard and E. S. Malloch. *Can. Dept. Mines, Mines Branch, Bull. 27.* 83 pp.

CEMENT. The technical analysis of Portland cement. W. O. Andrews. *J. S. Afr. Assoc. Anal. Chem.*, January, 3-5.

NITROGLYCERIN. Note on the formation of a solid phase in nitroglycerin waste acid waters. H. H. Dodds. *J. S. Afr. Assoc. Anal. Chem.*, January 22-24. The formation of crystals during the cooling of waste acid waters is noted.

OILS. Vegetable fats and oils. M. Rindl. *S. Afr. J. Ind.*, January, 14-23. A general discussion of the subject, particularly from the South African point of view.

PHOSPHATES. The utilisation of iron-alumina phosphates. G. H. Stanley. *J. S. Afr. Assoc. Anal. Chem.*, January, 13-21. The utilisation of these minerals for making superphosphates is considered.

WATER. Water purification at Kynoch's explosive factory. H. H. Dodds. *J. S. Afr. Assoc. Anal. Chem.*, January, 6-12. The methods used and results obtained are described.

French

AIR. The electrical purification of air. D'Arsonval, Bordas and Touplain. *Comptes rend.*, March 15, 636-638. Experiments on the separation of dust and bacteria from air are described.

ANALYSIS. Rapid determination of copper sulphate in manufacturing liquors. E. C. Carron. *Ann. Chim. Anal.*, March 15, 69-71.

Determination of glucose in presence of lactose. E. Hildt. *Ann. Chim. Anal.*, March 15, 78-80.

HYDROCARBONS. Preparation of some volatile saturated acyclic and cyclic hydrocarbons from petroleum spirit. G. Chavanne and L. J. Simon. *Ann. Chim. Anal.*, March 15, 76-78. The number of hydrocarbons have been isolated and identified.

MINERALS. Simple and rapid process for collecting and identifying deposits produced by metalloids and metals volatile at the temperature of the blowpipe flame. A. Braley. *Comptes rend.*, March 15, 661-663.

SEWAGE. Purification of sewage by the activated sludge process. R. Cambier. *Comptes rend.*, March 15, 681-684.

United States

CEMENT. Effect of fineness of cement. D. A. Abrams. *Bull. 4, Structural Materials Research Lab., Lewis Institute, Chicago.* 81 pp. The effect of fineness of cement on the resulting concrete has been studied.

POTASH. Identification of potash deposits. W. H. Ross and A. R. Merz. *Eng. & Min. J.*, March 6, 601-603. A description of the commoner potassium minerals and of the value of the deposits is given.

German

ANALYSIS. Quantitative estimation of trimethyleneglycol in dynamite glycerin and its fore-runnings. C. A. Rojahn. *Z. anal. Chem.*, Vol. 58, Pts. 10-11, 433-442.

Estimation of mercury by Glucksmann's method and its modifications. A. Abelmann. *Z. anal. Chem.*, Vol. 58, Pts. 10-11, 443-445.

The working-up of molybdenum residues obtained in the Lorenz method of determining phosphoric acid. H. Neubauer and E. Wolferts. *Z. anal. Chem.*, Vol. 58, Pts. 10-11, 445-448.

Miscellaneous

ANALYSIS. The titration of mixed acids by electrometric methods. J. M. Kolthoff. *Rec. Trav. Chim. Pays-Bas*, March 15, 280-302. A method for determining weak acids in presence of strong acids or weak bases in presence of strong bases is described.

CEMENT. The effect of calcium sulphate on cement. J. C. Witt. *Philippine J. Sci.*, Vol. 14, No. 2, 221-232. A series of experiments is described.

OILS. The Lumbany oil industry in the Philippine Islands. R. H. Aguilar. *Philippine J. Sci.*, Vol. 14, No. 3, 275-285.

VAPOUR TENSION. Notes on vapour tension and heat of evaporation. J. J. Van Laar. *Rec. Trav. Chim. Pays-Bas*, March 15, 215-242. A mathematical treatment of the subject.

Value of Colloids in Medicine

A LECTURE on "The Use of Colloids in Health and Disease" was given by Mr. A. B. Searle, Hon. Secretary of the National Association of Industrial Chemists, on Monday, to members of the Manchester Rotary Club.

The lecturer said that medical men and chemists had long sought for a series of medicines and disinfectants which, while deadly in their action on bacteria and other germs, were free from any risk of poisoning human beings. Remarkable results had been obtained during the past few years from the study of a state of matter which was intermediate between that of suspension in a fluid and true solution. It was known as the colloidal state. Many substance, of widely different composition and characteristics could be obtained in this state. The particles of colloidal matter were so minute that in many instances they could not be seen with ordinary microscopes, but by means of an instrument known as the ultra-microscope they might be recognised, and they were seen to be endowed with violent motion. Many processes conducive to health depended on colloidal activity; thus the purification of sewage depended almost wholly on its ability to form colloidal solution with grease and dirt. The researches of the late Henry Crookes—a son of Sir William Crookes—proved the germicidal power of elementary colloids.

The germicidal power of colloids soon led to their being employed as medicines, as well as germicides, with remarkable results. Crooke's work was followed up by further investigations which resulted in the preparation of certain well-known metals such as silver, copper, mercury manganese, and palladium, and of such non-metallic elements as iodine and arsenic in the form of colloidal sols which were insotonic with the fluids of the human body. These researches had made available a new series of liquids of great importance in the treatment of some of the most serious diseases The most striking characteristic of these preparations was their freedom from poisoning properties which rendered the same substances risky when administered in the form of ordinary solutions. On this account large doses of colloidal sols might be given with impunity, under proper medical supervision, and cures which were ordinarily prolonged were effected rapidly. One marked difference between elements in solution and in the colloidal state was clearly seen in the case of silver and iodine. Both the pharmaceutical preparations of these substances in common use stained the skin badly, but the colloidal preparations were quite stainless, and they were equally effective and often of greater therapeutic value. Attempts to produce similar preparations had been made by several German chemists, but most of the foreign preparations lacked stability, and decomposed before reaching the seat of the disease they were designed to cure. The British colloidal sols, on the contrary, were quite stable and effective. The success which had attended investigations on the use of colloids as remedial agents was so great as to afford a basis of hope that further developments would be still more beneficial to suffering humanity. It was probable that serum and vaccine therapy would ultimately be resolved into questions of colloidal chemistry.

A FIRE OCCURRED at the chemical works at South Ulverston on Monday, apparently through some tar running out of the still catching fire, and then igniting the contents of other stills. There is no official estimate of the damage, but it is stated to be about £1,000.

Patent Literature

We publish each week a list of selected complete specifications accepted as and when they are actually printed and on sale. In addition, we give abstracts within a week of the specifications being obtainable. Readers can thus decide what specifications are of sufficient interest to warrant purchase, the only way of obtaining complete information. A list of International Convention specifications open to inspection before acceptance is added, and abstracts are given as soon as possible.

Abstracts of Complete Specifications

122,188. VULCANISED RUBBER, PROCESS FOR REGENERATING. S. Van Raap, Weesperzijde, 102, Amsterdam, Holland. International Convention date (Holland), January 8, 1918.

200 parts of ground rubber refuse are mixed with 100 parts of unboiled linseed oil in a double-walled boiler provided with a stirring and kneading apparatus, and heated to 150°C. 30 parts of sulphur are then added, and the mixture is heated to 160°-170°C. for a sufficient time to ensure the vulcanisation of the oil. The product is then rolled and may be subjected to the same treatment as new rubber; new rubber and any filling materials, such as paraffin, zinc-white, &c., may be added.

122,819 and 128,181. AROMATIC ARSENICAL COMPOUNDS. The Rockefeller Institute for Medical Research, 66th Street and Avenue A, New York. Assignees of W. A. Jacobs, 430, Homestead Avenue, Mount Vernon; W. H. Brown, 6, Cedar Court, Flushing, Long Island; M. Heidelberger, 142, West 91st Street; and L. Pearce, 100, East 17th Street, all in New York. International Convention dates (U.S.A.), January 28 and June 13, 1918. Addition to 120,385, October 3, 1917.

122,819. Specification 120,385 (*see* THE CHEMICAL AGE, Vol. II., page 182) describes the preparation of certain arsenical synthetic drugs which may be described as N-(arsenoaryl)-bis-*a*-aminoacylarylamides. A compound of this character in which the aminoacylarylamide side chain has the general formula $NHCHRCONH\,Ar$, where Ar is an aryl or substituted aryl radical and in which the arylamide nucleus contains an attached salt forming substituent, is combined with hydrochloric or sulphuric acid. The preparation of the salt formed by the combination of hydrochloric acid with N-(arsenophenyl)-bis-glycyl-*m'*-amino-phenol is described and also the combination of hydrochloric acid with N-(*p*-arsenophenyl)-bis-glycyl-*m'*-aminophenol (*p*-arsenophenyl-glycine-bis-*m'*-oxyanilide).

128,181. The arseno compounds described in 123,385 are converted into their sodium or potassium salts by treatment with sodium or potassium hydroxide. The preparation of the sodium salt of *p*-arsenophenyl-glycine-bis-*m'*-oxyanilide is described.

138,946 and 138,954. ZINC SOLUTIONS, PURIFICATION OF. S. Field, Northampton Polytechnic Institute, St. John's Street, London, E.C., and The Metals Extraction Corporation, Ltd., Finsbury House, Blomfield Street, London, E.C.2. Application date, May 22, 1918.

138,946. The object is to remove impurities such as copper, cadmium, iron, antimony, arsenic, nickel and cobalt from zinc sulphate solution, in order to obtain a successful deposition of zinc by electrolysis. The impure liquor obtained by treating calcined zinc ore with sulphuric acid is filtered and the acid neutralised, and the liquor is heated to 80°-100°C. in a vessel provided with steam pipes fed with waste steam. About one quarter per cent. of manganese compound, such as the dioxide or hydrate or lead oxide or carbonate, or zinc oxide hydrate, or carbonate is added, and ozonised air is passed through the liquid. Oxides of iron and cobalt and compounds of arsenic and antimony are precipitated by this treatment, but copper nickel and cadmium are not completely removed; the final traces of these metals may be removed by treatment with zinc fume, as described in 138,947 (*see* below), or with zinc in the presence of acid as described in 138,954 (*see* below). If the original zinc liquor contains manganese, a sufficient precipitation of manganese compound for the reaction may be obtained by the addition of chalk or the like. If lead anodes are employed in the subsequent electrolysis the manganese is deposited on the anodes as dioxide mixed with lead dioxide, and this mixture may be added to the impure zinc solution to be treated with ozone.

138,954. The process is for the preparation of pure zinc sulphate solutions for electrolysis by the removal of the nickel, copper, and cadmium. The impure liquor obtained as above is treated by known methods for the removal of iron, arsenic and antimony. The solution is then run into a tank provided with an agitator, and sulphuric acid is added in the proportion of 7 lb. to 14 lb. of 70 per cent. acid to 5 or 6 tons of liquor, and the solution is heated to 80° to 100°C. Zinc fume or blue powder is then added in considerably larger proportion than the chemical equivalent, and copper, cadmium and nickel are thereby precipitated. It is found that this precipitation is greatly facilitated by the presence of copper, and if this element is not present in the ore it may be added in the form of copper sulphate or carbonate. If there is a tendency for the formation of basic zinc sulphate during the removal of nickel, a further small quantity of acid may be added during the process of purification. Alternatively, the sulphated zinc may be revivified for further purification by washing it with dilute sulphuric acid.

138,947 and 138,948. ZINC SOLUTIONS, PURIFICATION OF. H. L. Sulman, 44, London Wall, London, E.C.2; S. Field, Northampton Polytechnic Institute, St. John's Street, London, E.C.; and The Metals Extraction Corporation, Ltd., Finsbury House, Blomfield Street, London, E.C.2. Application date, May 28, 1918.

The process is for the purification of zinc sulphate solutions which are to be subsequently electrolysed for the deposition of zinc. Copper, cadmium and similar electro-negative metallic impurities are removed by tube milling with zinc balls or agitating the solutions with zinc dust, and iron, arsenic, and antimony are also removed by known methods. The solution is then treated with zinc fume or blue powder which has been previously washed with acid to remove oxide to facilitate its action. The reaction is carried out at a temperature of 80° to 100°C., which is obtained by steam heating. A proportion of 1 part of zinc fume to 200 parts of liquor is usually sufficient to precipitate all the nickel and any remaining traces of copper and cadmium; the nickel content of the solution may thus be reduced to 0·5 part per million or less. The zinc fume may be used several times with the addition of small quantities of fresh powder or fume, and the spent zinc may finally be recovered by dilute sulphuric acid, *e.g.*, the liquor produced in the electrolytic cells. The solutions may finally be treated for the removal of any cobalt present.

138,948. The crude zinc sulphate solution is first treated for the removal of iron, copper, cadmium, arsenic and antimony in the known manner as described in the previous abstract. The solution is then heated to 80° to 100°C. and agitated with a mixture of lead peroxide and manganese dioxide, preferably the mud obtained from the electrolytic cells in which zinc is deposited from manganiferous zinc solutions with lead anodes. The reagent is added in the proportion of 1 part to 200 parts of liquor and the cobalt is precipitated as a higher oxide together with lead sulphate; the manganese goes into solution as sulphate, but this does not interfere with the subsequent electrolytic deposition of the zinc. The cobalt may be reduced by this process to about 0·5 to 1 part per million of the liquor. The solution may then be treated for the removal of nickel by the addition of zinc fume to the warm solution as described in 138,947 above.

138,950. METALLIC SOLUTIONS, PURIFICATION OF. S. Field, Northampton Polytechnic Institute, St. John's Street, London, E.C.1; and the Metals Extraction Corporation, Ltd., Finsbury House, Blomfield Street, London, E.C.2. Application date, June 28, 1918.

A metallic solution is purified from foreign metals by immersing in the solution two metals in contact, other than the metal to be removed; one of the metals must be electro-

negative and the other electro-positive to the metal to be removed. When applied to the purification of zinc solutions, one of the metals may be zinc and the other a metal which is lower in the electro-chemical series, such as mercury. The electro-positive metal, *e.g.*, zinc, aluminium, or magnesium, is preferably in the form of filings, turnings, granules or sheet and is amalgamated with mercury by immersion in a solution of a mercury salt. The metal is placed in the crude solution, which is heated to 70° to 100°C. and acidified with 0·1 per cent. of sulphuric acid. Copper, arsenic, antimony, bismuth, cadmium, nickel and cobalt are precipitated on the amalgamated metal in the form of a metallic mud, which is periodically removed. If aluminium is employed some may be dissolved, but this is not detrimental to the subsequent electrolytic deposition of the zinc. When employing this process it is necessary that the two metals used should be widely separated in the electro-chemical series so as to produce a sufficient difference of potential to remove all the metallic impurities and prevent their re-solution.

138,999. ALDEHYDES, MANUFACTURE OF. A. I. Appelbaum, 109, Chancery Street, Trenton, N.J., U.S.A. Application date, February 19, 1919.

The process is for directly oxidising aromatic hydrocarbons containing the CH_3 group to aldehydes, more particularly the manufacture of benzaldehyde from toluene. A mixture of 92 parts toluene, 100 parts of finely ground manganese dioxide, 150 parts of sulphuric acid diluted with three times its volume of water, and about 5 parts of a catalyst consisting of ferric, cupric or ceric sulphate is charged into a digester having an acid-proof lining. The mixture is raised to boiling point and benzaldehyde is produced mixed with a small proportion of benzoic acid. Steam is passed through the mixture to extract the benzaldehyde and unconverted toluene, and the vapour is passed to a condenser where the mixture of benzaldehyde and toluene is separated from the water. The mixture is then fractionated at about 120°C., when the toluene distils off, leaving the benzaldehyde which may then be purified by distillation. The apparatus for carrying out the process is described in detail.

139,005. ALUMINA, MANUFACTURE OF. K. J. P. Orton and G. W. Robinson, University College of North Wales, Bangor. Application date, February 26, 1919.

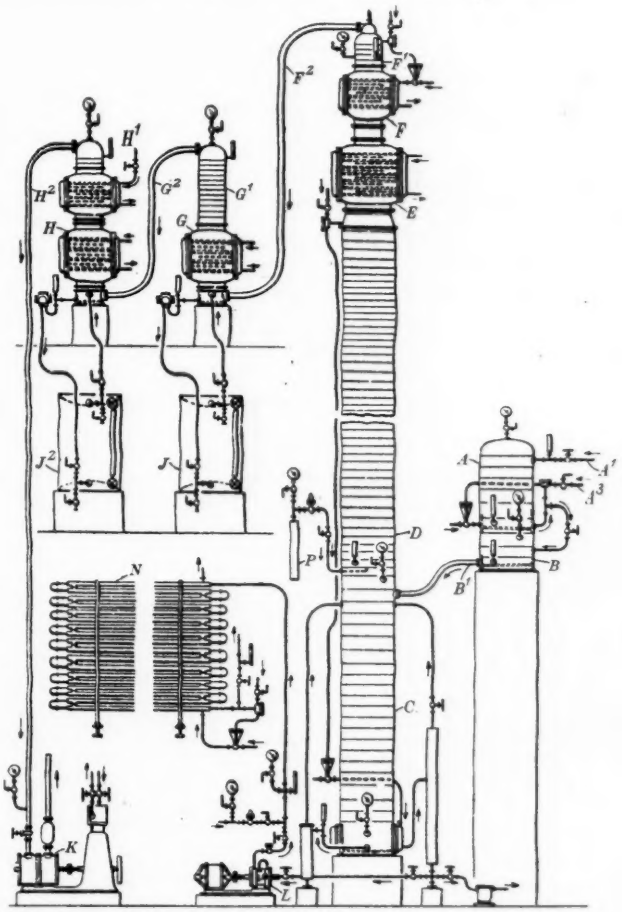
The process is for the preparation of alumina from slate and other minerals having a high proportion of iron oxide. Slate is ground to a powder which will pass a 100 mesh sieve, and 1 part is mixed with 3 to 4 parts of nitre cake and heated to redness for a short time. The mass is cooled and lixiviated with 150 parts of water, the solution being slightly acid. The solution is heated to 70°-80°C. as long as hydrated ferric oxide is precipitated. The proportion of ferric oxide may thus be reduced from about one-third to one-tenth and the mixture is then separated by the usual methods.

139,094. ARTIFICIAL FUEL. L. Lane, Borough Road, Loughor, Glam.; and D. H. Williams, Llanhirœth, Grovesend, near Pontardulais, Glam. Application date, July 2, 1919.

119 parts of small coal such as "anthracite small" or "duff" or other inferior coal is mixed with 17 parts of waste pitch from tin-plate or steel works, 1 part of sodium nitrate, and 17 parts of carbonaceous shale and/or clod together with a small proportion of clay. The materials are heated, mixed and briquetted. When the fuel is to be employed with forced draught the proportion of carbonaceous shale may be increased.

139,099. ETHYL ALCOHOL AND DE-ALCOHOLISED BEVERAGES FROM FERMENTED LIQUORS, MANUFACTURE OF. H. Wade, London. (From J. Schneible, 130, North Wells Street, Chicago, Ill., U.S.A.). Application date July 18, 1919.

The object is to obtain pure ethyl alcohol from fermented liquor and also a residual liquid suitable for the manufacture of beverages. The fermented liquor is passed into a heater A through a pipe A′, and an air pressure pipe A^3 is also connected to the heater. The whole system is maintained under vacuum by a pump K at the other end. The liquor passes from the heater A into a fractionator B where it is atomised by the low pressure, and the mixture of liquid and vapour passes through the pipe B′ to the column-still C, which consists of a series of horizontal, spaced, annular plates separated by overlapping concentric discs; the column-still is heated by steam at the bottom. The descending mixture becomes de-alcoholised, and the mixture of gas and vapour rises into the dephlegmating column D for separation and dephlegmation. The alcohol vapour rises into the dephlegmators E and F and passes thence through the vapour separator F′ and pipe F^2 to the rectifier G. The vapour rises from the rectifier through the vapour separator G′ and then passes by the pipe G^2 to the condenser H, on which a final separator H′ is superposed. Any uncon-



139,099

densed vapour is withdrawn through the pipe H^2 by the pump K. The rectifier G is provided with a collecting vessel J in which ethyl alcohol of 90 per cent. purity collects, and the condenser H is provided with a collecting vessel J^2, in which the purity of the alcohol reaches 97 per cent. Any low-boiling products in the column D may be oxidised by the introduction of oxygen from the container P. The higher boiling constituents and residues which collect at the base of the still C are withdrawn by the ejector L and pass to the cooler N, after which they may be further treated for beverage purposes.

139,106. COAL, AGGLUTINANT FOR THE CONGLOMERATION OF. L. A. E. Irazusta, Avenida de los Fueros 1, Zarauz, Guipusca, Spain. Application date, August 7, 1919.

An agglutinant for binding coal is composed of 97 per cent. of tar and 3 per cent. of tallow or other fatty substance. The addition of tallow reduces the proportion of agglutinant necessary for binding the coal to 3 per cent. or 4 per cent., instead of the usual 7 to 10 per cent. of tar.

139,115. ARTIFICIAL FUEL. B. J. Seccombe, 73, Haworth Road, Gorton, Manchester; and J. Sandiford, 5, Hall Street, Gorton, Manchester. Application date, August 25, 1919.

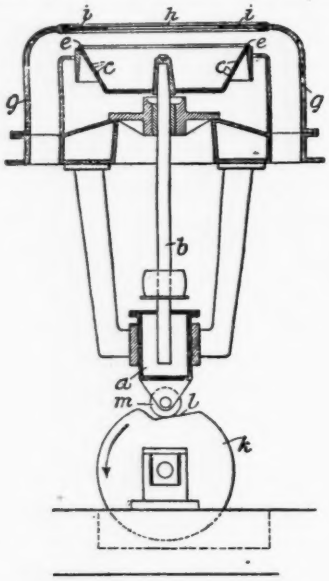
The fuel consists of coal slack about 67 parts, clay 22 parts,

lime 1·6 parts, fibrous material 0·4 parts, water 8 parts, and 1 part of a composition obtained by mixing about 97 parts of salt with 1 part each of saltpetre, flowers of sulphur, and alum.

International Specifications Not yet Accepted

137,827. CENTRIFUGAL MACHINES. Fesca & Sohn,, 127, Herzbergstrasse, Lichtenberg, Berlin. (Assignees of L. von May, Ung-Ostra, Moravia, Austria). International Convention date, June 26, 1915.

The rotating basket *c* of a centrifugal machine is carried by a vertical shaft *b* which is supported by a footstep bearing *a*.



137,827

When the basket is rotating, the rim *e* is normally in contact with the annular ring *i* which rotates with the basket and retains the solid material. In order to discharge the solid material without stopping the machine, the cam *k* is turned until the roller *m* drops into a recess *l*, when the rim *e* separates from the ring *i* and allows the material to be discharged by centrifugal force.

137,831. CELLULOSE. C. A. Braun, 3, Geroltstrasse Munich, Germany. International Convention date, August 5, 1916.

Highly lignified material such as wood is heated under pressure in a solution containing alkaline sulphites and sulphides with or without sodium carbonate, alkali metal soaps, or the like, in order to produce hemi-cellulose. If slightly lignified plants such as jute, Manila hemp, reed grass, typha, or nettles, are similarly treated, cellulose or textile fibres are produced.

137,834. CONCENTRATING NITRIC ACID. H. Frischer, 4, Paulstrasse, Zehlendorf, Germany. International Convention date, August 31, 1916.

Nitric acid may be concentrated by mixing it with a heated liquid which has no chemical action on it, such as sulphuric, phosphoric or arsenic acids, various salt solutions, or molten materials, such liquid also having a higher boiling point than nitric acid. The vapour is passed into a dephlegmator, and the vapour passing from the dephlegmator may be returned to it together with freshly vaporised acid to produce a greater concentration.

LATEST NOTIFICATIONS.

140,051. Pythalic Anhydride, Process of Producing and Manufacturing. H. Sasa. March 7, 1919.

140,059. Evaporating Liquors, Method of, and Apparatus Therefor. Metallbank und Metallurgische Ges. March 13, 1919.

140,060. Ammonia, Process and Apparatus for the Synthetic Production of. L. Duparc and C. Urfer. March 13, 1919.

140,061. Catalysts, Process for the Production of. L. Duparc and C. Urfer. March 13, 1919.

140,069. Aluminium, Process for Increasing the Resistance of—to Acid and Alkaline Liquors. Metallindustrie Schiele et Bruchsaler. March 8, 1919.

140,077. Water, Sterilisation and Clarification of. Manganazene Soc. Anon. December 12, 1913.

140,083. Protection of the Walls of Enclosures in which Reactions take place under High Temperatures and Pressures. Soc. l'Air Liquide. December 18, 1918.

140,089. Exothermic Chemical Reactions under High Temperatures and Pressures, Apparatus for Use in Carrying Out. Soc. l'Air Liquide. December 24, 1918.

140,090. Ammonia and Gas, Manufacture of—by Distillation of Fuel in Vertical Retorts of Rectangular Cross Section. L. J. Terneden and P. J. Kummel. March 10, 1919.

140,096. Metals or Metalloids, their Alloys and Combinations, Process for the Production of. L. P. Bassett. March 10, 1919.

Specifications Accepted, with Date of Application

109,813. Inulin, Process for obtaining—from Plants. A. Daniel. September 18, 1917.

117,605. Anhydrite, Process for the Manufacture of a Mortar-forming Material from. F. Hartner. July 18, 1917.

123,716. Evaporation of Water from Aqueous Liquids. Akt.-Ges. Kummler & Matter. February 26, 1918.

125,946. Methyl Alcohol, Manufacture of. J. A. Christiansen. April 20, 1918.

139,229. Fine Ores, Iron Filings, Flue Dust, Purple Ore, and the like, Processes for Solidifying Conglomerates of. C. Giesecke. October 4, 1916.

139,232. Cellulose Acetates, Process for the Manufacture and Production of. J. O. Zdanowich. April 8, 1918.

139,233. Hydrocarbons, Refining Liquid. A. E. Dunstan. June 3, 1918.

139,234. Aromatic Substances, Apparatus Applicable for the Sulphonation, Nitration and Chlorination of. H. N. Morris & Co. and H. N. Morris. June 5, 1918.

139,237. Scrubbers, Saturators and Similar Apparatus. P. Poore. November 20, 1918.

139,239. Hydrogenating Oils, Method of and Process for. G. Martin. November 27, 1918.

139,263. Coal Tar Hydrocarbons and other like Matters, Fractional Distillation Plant for. W. E. Edwards. January 28, 1919.

139,296. Mono-polar Electrde Electrolysers. G. G. Hepburn. February 22, 1919.

139,390. Filter Leaves. A. R. Peck. October 22, 1918.

139,419. Gallic Acid, Process for the Preparation of. E. C. R. Marks. (Nitritfabrik Akt.-Ges.). August 29, 1919.

139,441. Carbazole, Purification of. South Metropolitan Gas Co. and W. Kirby. November 14, 1919.

139,443. Zinc Sulphate, Process for the Purification of Solutions of. Compagnie des Produits Chimiques d'Alais et de la Camargue. September 12, 1919.

Patents Court Cases

Announcement is made that the application for a licence under the Trading with the Enemy Act, 1916, by Cellon, Ltd., and Rice & Hochester in respect of Patent No. 1441/1910 (A. Eichengrün) and by Cellon, Ltd., in respect of 18,076/1910 (A. Eichengrün) are now abandoned. These patents relate to coatings and solutions of acetyl-cellulose.

Research in Non-Ferrous Industries

PROFESSORS H. C. H. Carpenter, C. H. Desch, T. Turner, C. A. Edwards, Dr. W. Rosenhain and Messrs. W. R. Barclay and A. E. Seaton have promised to assist in an advisory capacity the British Non-Ferrous Metals Research Association whose headquarters are at 30, Paradise Street, Birmingham. The province of the Association—which will take the form of a limited liability company working without profit and with a normal guarantee for members in place of shares—includes all the non-ferrous metal industries throughout the country including copper, brass, zinc, aluminium, gold, silver, and other alloys, and its objects are defined as "to arrange for the carrying out of scientific and industrial research and the dissemination among its members of technical and other information relating to the production, treatment, manufacture, and uses of non-ferrous metals." All British firms engaged in any branch of the non-ferrous metal industry, whether producers, manufacturers, or users, are invited to join the Association. Subject to certain conditions, *e.g.*, that research is conducted on a sufficiently large scale, for every £1 expended annually on research and the information bureau, a grant of £1 (up to £5,000) will be made annually over the agreed period from the Government fund of a million sterling placed at the disposal of the Department of Scientific and Industrial Research.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co. and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

British Market Report

THURSDAY, March 24.

There has been an active enquiry during the week for the majority of Chemicals, and whilst the actual business transacted has not been so heavy, due to the shortage of supplies, a fair volume of business has been definitely confirmed. Markets are strong with comparatively small fluctuation.

The export demand still continues heavy, but business is further hampered in many directions by the difficulty of obtaining supplies, and in the case of Intermediates on account of being unable to obtain export licences.

General Chemicals

ACETONE is unchanged in price with a steady demand for export.

ACID ACETIC.—Foreign makers are still reluctant to quote and are waiting for the expected advance in the price of Acetate of Lime. Spot material is very scarce and arrivals are eagerly snapped up at a considerable premium over recent values.

ACID CARBOLIC is unchanged in price and the quotation is almost nominal.

ACID FORMIC is in very good request at recent quoted prices.

ACID HYDROCHLORIC.—Makers indicate an advance to take effect as from April 1.

ACID OXALIC is in strong demand, but with little offering for spot delivery. A small quantity is offered for forward delivery at full prices.

ACID SULPHURIC.—We understand that makers have decided to advance their price as from April 1.

ACID TARTARIC is still in strong demand, and the market is very firm.

ARSENIC has been rather quiet and the price is easier.

BARIUM SALTS are in good demand and the price of Chloride is expected to advance in sympathy with Acetate.

FORMALDEHYDE.—There is little to add to our recent report. The quotation is quite nominal and the price of the small lots which appear on the market is only governed by the holders' ideas of their value.

LEAD ACETATE.—Both White and Brown qualities are in good demand and there are indications of an early advance.

LITHOPONE is still quiet and there is only a small quantity of material arriving.

POTASSIUM PERMANGANATE is still scarce on the spot and the price has an upward tendency.

POTASSIUM PRUSSIATE has been in good demand.

SODIUM ACETATE is in short supply and the price is well maintained.

SODIUM BICHROMATE is almost unobtainable, and extravagant prices are being paid for re-sale lots.

SODIUM BISULPHITE.—Makers are still heavily sold.

SODIUM CHLORATE is dull.

SODIUM CAUSTIC.—The export demand is still good, but more material appears to be on the market.

SODIUM HYPOSULPHITE is firm with very little offering.

SODIUM NITRITE is extremely scarce, but a small business has been transacted at a very high figure.

SODIUM PHOSPHATE is in short supply for prompt, and makers are booking very heavily for forward.

SODIUM PRUSSIATE is without change and price is still very firm.

SODIUM SULPHIDE is very scarce. America is now unable to give very early shipment.

ZINC SALTS continue in request and moderate business has passed in Sulphate.

Coal Tar Intermediates

The market is without change. Products in the majority of cases are extremely short, which the few shipments from America in no degree alter.

ALPHA NAPHTHOL.—Further business has been transacted in this material for forward delivery.

ALPHA NAPHTHYLAMINE.—A small quantity has arrived from America, but this has not helped to relieve the position to any great extent.

BETA NAPHTHOL is in much the same position, and only small quantities are leaving the works.

NAPHTHIONATE OF SODA is still in good demand, but makers are heavily committed.

PARANITRANILINE is without change.

PARAPHENYLENE DIAMINE.—Some good business has been transacted in this article and makers are fully engaged.

PHTHALIC ANHYDRIDE is in good demand, but makers can only offer small quantities.

Coal Tar Products

There is little change in our market since last week.

90's BENZOL.—Remains at 2s. 5d. on rails.

CRESYLIC ACID.—Supplies are scarce, and for Pale quality 97/99 per cent. the price is 4s. 3d. per gallon; for Dark 95/97 per cent. 4s. per gallon.

CREOSOTE OIL.—Remains firm at about 10½d. to 11d. in the North, and 11d. to 11½d. in the South.

SOLVENT NAPHTHA.—Is worth 3s. 2d. to 3s. 3d. per gallon.

HEAVY NAPHTHA.—Is worth 3s. 6d. per gallon and is difficult to obtain.

NAPHTHALENE.—Has a very strong market and supplies are very difficult to obtain. Crude is worth £14 to £18 per ton, and refined £33 to £36 per ton.

PITCH.—The position is unchanged and prices are well maintained.

Sulphate of Ammonia

The demand for home consumption is particularly strong and the production is hardly sufficient to meet all the requirements.

Current Prices

Chemicals

	per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	3	3	to	0	3	6
Acetone oil	ton	80	0	0	to	83	0	0
Acetone, pure	ton	92	0	0	to	95	0	0
Acid, Acetic, glacial, 99-100%	ton	105	0	0	to	110	0	0
Acetic, 80% pure	ton	90	0	0	to	92	10	0
Arsenic	ton	100	0	0	to	105	0	0
Boric, cryst.	ton	74	10	0	to	76	0	0
Carbolic, cryst. 39-40%	lb.	0	1	4	to	0	1	4½
Acid, Citric	lb.	0	6	6	to		—	
Formic, 80%	ton	115	0	0	to	120	0	0
Gallic, pure	lb.	0	7	3	to	0	7	9
Hydrofluoric	lb.	0	0	7	to	0	0	8
Lactic, 50 vol.	ton	65	0	0	to	70	0	0
Lactic, 60 vol.	ton	80	0	0	to	85	0	0
Nitric, 80 Tw.	ton	38	0	0	to	40	0	0
Oxalic	lb.	0	2	8	to	0	2	9
Phosphoric, 1.5	ton	60	0	0	to	65	0	0
Pyrogallic, cryst	lb.	0	11	6	to	0	11	9
Salicylic, Technical	lb.	0	3	0	to	0	3	3
Salicylic, B.P.	lb.	0	3	9	to	0	4	0
Sulphuric, 92-93%	ton	7	10	0	to	8	0	0
Tannic, commercial	lb.	0	5	0	to	0	5	3
Tartaric	lb.	0	3	11	to	0	4	0
Alum, lump	ton	19	10	0	to	20	0	0
Alum, chrome	ton	93	0	0	to	95	0	0
Alumino ferric	ton	9	10	0	to	10	0	0
Aluminium, sulphate, 14-15%	ton	16	0	0	to	16	10	0
Aluminium, sulphate, 17-18%	ton	18	10	0	to	19	0	0
Ammonia, anhydrous	lb.	0	1	9	to	0	2	0
Ammonia, .880	ton	35	0	0	to	37	10	0
Ammonia, .920	ton	20	0	0	to	24	0	0
Ammonia, carbonate	lb.	0	0	7½	to		—	
Ammonia, chloride	ton	95	0	0	to	97	10	0
Ammonia, muriate (galvanisers)	ton	52	0	0	to	54	0	0
Ammonia, nitrate	ton	60	0	0	to	65	0	0
Ammonia, phosphate	ton	135	0	0	to	140	0	0
Ammonia, sulphocyanide	lb.	0	2	3	to	0	2	6
Amyl, acetate	ton	360	0	0	to	370	0	0
Arsenic, white, powdered	ton	67	10	0	to	70	0	0
Barium, carbonate	ton	13	10	0	to	14	10	0
Barium, carbonate, 92-94%	ton	14	10	0	to	15	0	0
Chlorate	lb.	0	1	4	to	0	1	5
Chloride	ton	26	0	0	to	27	0	0

	per	£	s.	d.		£	s.	d.
Barium, Nitrate	ton	50	0	0	to	51	0	0
Sulphate, blanc fixe, dry	ton	25	10	0	to	26	0	0
Sulphate, blanc fixe, pulp	ton	15	10	0	to	16	0	0
Bleaching powder, 35-37%	ton	18	10	0	to	19	0	0
Borax crystals	ton	41	0	0	to	42	0	0
Calcium acetate, Brown	ton	18	10	0	to	20	0	0
,, Grey	ton	38	0	0	to	40	0	0
Carbide	ton	28	0	0	to	30	0	0
Chloride	ton	10	10	0	to	11	10	0
Carbon bisulphide	ton	58	0	0	to	59	0	0
Casein, technical	ton	80	0	0	to	83	0	0
Cerium oxalate	lb.	0	3	9	to	0	4	0
Chromium acetate	lb.	0	1	0	to	0	1	2
Cobalt acetate	lb.	0	7	0	to	0	7	6
Oxide, black	lb.	0	7	9	to	0	8	0
Copper chloride	lb.	0	1	3	to	0	1	6
Sulphate	ton	48	0	0	to	50	0	0
Cream Tartar, 98-100%	ton	305	0	0	to	310	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde 40% vol.	ton	350	0	0	to	360	0	0
Formusol (Rongalite)	lb.	0	4	0	to	0	4	3
Glauber salts	ton	5	0	0	to	5	10	0
Glycerine, crude	ton	72	0	0	to	74	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	9	to	0	3	0
Iron perchloride	ton	40	0	0	to	42	0	0
Iron sulphate (Copperas)	ton	4	10	0	to	4	15	0
Lead acetate, white	ton	105	0	0	to	110	0	0
Carbonate (White Lead)	ton	75	0	0	to	78	0	0
Nitrate	ton	80	0	0	to	85	0	0
Litharge	ton	71	0	0	to	73	0	0
Lithophone, 30%	ton	60	0	0	to	62	0	0
Magnesium chloride	ton	15	10	0	to	16	10	0
Carbonate, light	cwt.	2	15	0	to	3	0	0
Sulphate (Epsom salts commercial)	ton	14	0	0	to	14	10	0
Sulphate (Druggists')	ton	18	10	0	to	19	10	0
Manganese, Borate	ton	180	0	0	to	185	0	0
Sulphate	ton	80	0	0	to	82	10	0
Methyl acetone	ton	89	0	0	to	90	0	0
Alcohol, 1% acetone	gall.	Nominal						
Nickel ammonium sulphate, single salt	ton	47	10	0	to	52	10	0
Potassium bichromate	lb.	0	1	10	to	0	2	0
Carbonate, 90%	ton	102	0	0	to	105	0	0
Chloride	ton	Nominal.						
Potassium Chlorate	lb.	0	1	1	to	0	1	2
Hydrate, 88-90%	ton	115	0	0	to	120	0	0
Meta-bisulphite, 50-52%	ton	260	0	0	to	270	0	0
Nitrate, refined	ton	68	0	0	to	70	0	0
Permanganate	lb.	0	6	6	to	0	7	0
Prussiate, red	lb.	0	6	0	to	0	6	3
Prussiate, yellow	lb.	0	2	3	to	0	2	4
Sulphate, 90%	ton	31	0	0	to	33	0	0
Salammoniac, firsts	cwt.	4	15	0	to		—	
Seconds	cwt.	4	10	0	to		—	
Sodium acetate	ton	60	0	0	to	62	0	0
Arsenate, 45%	ton	60	0	0	to	62	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Sodium, Bichromate	lb.	0	2	1	to	0	2	2
Bisulphite, 60-62%	ton	42	10	0	to	45	0	0
Chlorate	lb.	0	0	5¾	to	0	0	6¼
Caustic, 70%	ton	42	10	0	to	43	10	0
Caustic, 76%	ton	44	10	0	to	45	10	0
Hydrosulphite, powder, 85%	lb.	0	3	3	to	0	3	6
Hyposulphite, commercial	ton	27	10	0	to	29	10	0
Nitrite, 96-98%	ton	120	0	0	to	125	0	0
Phosphate, crystal	ton	38	0	0	to	40	0	0
Perborate	lb.	0	2	2	to	0	2	4
Prussiate	lb.	0	1	11	to	0	2	0
Sulphide, crystals	ton	22	0	0	to	23	0	0
Sulphide, solid, 60-62%	ton	42	0	0	to	44	0	0
Sulphite, cryst.	ton	13	0	0	to	13	10	0
Strontium, carbonate	ton	85	0	0	to	90	0	0
Nitrate	ton	85	0	0	to	90	0	0
Sulphate, white	ton	8	10	0	to	10	0	0
Sulphur chloride	ton	42	0	0	to	44	10	0
Sulphur, Flowers	ton	25	0	0	to	27	0	0
Roll	ton	24	0	0	to	26	0	0
Tartar emetic	lb.	0	3	5	to	0	3	6
Tin perchloride, 33%	lb.	0	2	6	to	0	2	7
Perchloride, solid	lb.	0	3	0	to	0	3	3
Protochloride (tin crystals)	lb.	0	2	5	to	0	2	7
Zinc chloride, 102 Tw.	ton	24	0	0	to	26	10	0
Chloride, solid, 96-98%	ton	60	0	0	to	65	0	0
Oxide, 99%	ton	82	10	0	to	85	0	0
Oxide, 94-95%	ton	67	10	0	to	70	0	0
Dust, 90%	ton	90	0	0	to	92	10	0
Sulphate	ton	23	0	0	to	24	0	0

Coal Tar Intermediates, &c.

	per	£	s.	d.		£	s.	d.
Alphanaphthol, crude	lb.	0	3	9	to	0	4	0
Alphanaphthol, refined	lb.	0	4	3	to	0	4	6
Alphanaphthylamine	lb.	0	3	6	to	0	3	9
Aniline oil, drums extra	lb.	0	1	5	to	0	1	6
Aniline salts	lb.	0	1	10	to	0	2	0
Anthracene, 85-90%	lb.		—		to		—	
Benzaldehyde (free of chlorine)	lb.	0	5	6	to	0	6	0
Benzidine, base	lb.	0	12	6	to	0	13	6
Benzidine, sulphate	lb.	0	10	0	to	0	11	0
Benzoic, acid	lb.	0	5	9	to	0	6	0
Benzoate of soda	lb.	0	5	9	to	0	6	0
Benzyl chloride, technical	lb.	0	2	3	to	0	2	6
Betanaphthol benzoate	lb.	1	6	0	to	1	7	6
Betanaphthol	lb.	0	4	9	to	0	5	0
Betanaphthylamine, technical	lb.	0	8	6	to	0	9	0
Croceine Acid, 100% basis	lb.	0	5	6	to	0	6	6
Dichlorbenzol	lb.	0	0	6	to	0	0	7
Diethylaniline	lb.	0	7	9	to	0	8	6
Dinitrobenzol	lb.	0	1	5	to	0	1	6
Dinitrochlorbenzol	lb.	0	1	5	to	0	1	6
Dinitronaphthaline	lb.	0	1	4	to	0	1	6
Dinitrotoluol	lb.	0	1	8	to	0	1	9
Dinitrophenol	lb.	0	3	3	to	0	3	6
Dimethylaniline	lb.	0	4	9	to	0	5	0
Diphenylamine	lb.	0	4	6	to	0	4	9
H-Acid	lb.	0	13	6	to	0	14	0
Metaphenylenediamine	lb.	0	5	9	to	0	6	0
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	7	6	to	0	8	6
Monosulphonic Acid (2:7)	lb.	0	7	6	to	0	8	0
Naphthionic acid, crude	lb.	0	5	6	to	0	5	9
Naphthionate of Soda	lb.	0	6	0	to	0	6	6
Naphthylamin-di-sulphonic-acid	lb.	0	5	6	to	0	6	6
Nitronaphthaline	lb.	0	1	3	to	0	1	4
Nitrotoluol	lb.	0	1	3	to	0	1	6
Orthoamidophenol, base	lb.	0	18	0	to	1	0	0
Orthodichlorbenzol	lb.	0	1	0	to	0	1	2
Orthotoluidine	lb.	0	2	9	to	0	3	0
Orthonitrotoluol	lb.	0	1	6	to	0	1	8
Para-amidophenol, base	lb.	0	15	0	to	0	16	0
Para-amidophenol, hydrochlor	lb	0	15	6	to	0	16	0
Paradichlorbenzol	lb.	0	0	6	to	0	0	8
Paranitraniline	lb.	0	7	6	to	0	7	9
Paranitrophenol	lb.	0	2	6	to	0	2	9
Paranitrotoluol	lb.	0	5	3	to	0	5	6
Paraphenylenediamine, distilled	lb.	0	13	6	to	0	14	6
Paratoluidine	lb.	0	7	6	to	0	8	6
Phthalic anhydride	lb.	0	9	0	to	0	10	0
R. Salt, 100% basis	lb.	0	4	0	to	0	4	2
Resorcin, technical	lb.	0	11	6	to	0	12	6
Resorcin, pure	lb.	0	17	6	to	1	0	0
Salol	lb.	0	5	9	to	0	6	0
Shaeffer acid, 100% basis	lb.	0	3	6	to	0	3	0
Sulphanilic acid, crude	lb.	0	1	9	to	0	1	10
Tolidine, base	lb.	0	10	6	to	0	11	6
Tolidine, mixture	lb.	0	3	0	to	0	3	6

Mechanically-Fired Boiler Plants

In a Paper read before the Institution of Mechanical Engineers on Friday, March 19, Mr. David Brownlie gave the figures obtained from a complete scientific investigation of the working of 80 typical Lancashire boiler plants fired by mechanical stokers, and on the basis of his results pointed out the large saving of coal that could be effected were all the boiler plants of the country brought up to date and run on scientific lines. He found that the average net working efficiency of the 80 plants examined, including economisers and superheaters, and after deducting the steam or power used to produce steam, was about 59 per cent.; that is, of the total heat in the coal burnt 41 per cent. did not appear in the steam and was thus lost for practical purposes. In three of the plants the efficiency was 75 per cent. or more, and in 16 of them it was under 50 per cent. His results indicate that mechanically fired plants, as at present worked, are giving worse results than those obtained with hand firing. In his opinion, with continuous performance, whether with hand or mechanical firing, an average boiler can be run at an efficiency of 75 per cent., and he estimates that the amount of coal burnt annually in Lancashire boilers with mechanical stokers is from 14 to 18¾ million tons. Supposing, therefore, that the average efficiency of these is the 59 per cent. disclosed by his tests, a saving of 2,940,000 to 3,937,000 tons of coal would be effected annually were the efficiency of all of them brought up to 75 per cent. If all the boilers of the country were re-organised and run on proper lines, he calculates that from 15 to 20 million tons of coal could be saved annually on the national consumption of 75 to 100 million tons for raising steam, while if reform were extended also to the utilisation of the steam the saving would be at least 30 to 40 million tons.

Company News

AMERICAN CYANAMID CO.—A quarterly dividend of 1½ per cent. has been declared on the preferred stock.

CALIFORNIA PETROLEUM.—A quarterly dividend is announced on preferred stock of 1¾ per cent. actual, payable April 1.

ASSAM OIL.—The directors have declared a final dividend for the year 1919 of 3½ per cent. on the preference shares, payable March 31 to holders on the register March 24.

AMALGAMATED GLASS BOTTLE WORKS, LTD.—Allotment letters in respect of the recent issue have been posted. Subscriptions to the issue have liberated the underwriters in full.

MEXICAN PETROLEUM.—Quarterly dividends have been declared on common stock of 2½ per cent. actual, payable April 10, and on preferred stock of 2 per cent. actual, payable April 1.

PAN-AMERICAN PETROLEUM & TRANSPORT.—Quarterly dividends have been declared on common stock of 3 per cent. actual, payable April 10, and on preferred stock of 1¾ per cent. actual, payable April 1.

CASSEL CYANIDE CO.—The company, which has a paid-up capital of £176,250 in 5s. shares, has offered to allow the shareholders to take up, at par, one new share for each share held. The current price of the shares is 49s. each.

WOULDHAM CEMENT CO.—The net profits for 1919 were £39,639, after providing for debenture interest, and £9,255 was brought forward. After providing for all arrears of dividends on the preference shares, £14,485 remains, which it is proposed to carry forward.

LODERS & NUCOLINE, LTD.—The directors recommend that the capital be increased to £500,000 by the creation of 300,000 ordinary shares of £1 each, and also that £190,000 of the reserve fund be capitalised, one new ordinary share being added to every similar share now held.

ROSARIO NITRATE CO.—The accounts for the year ended September 30 last show a net profit of £39,487. £38,053 was brought in, making £77,540. The directors recommend a dividend of 10 per cent., free of tax, for the year, as compared with 15 per cent. for the previous year, carrying forward £17,540.

BRITISH PORTLAND CEMENT MANUFACTURERS.—A dividend of 8 per cent. actual, less tax, has been declared on the ordinary shares for the eight months ended December 31. After providing £75,000 for depreciation and the usual charges, the carry forward is increased to £136,264, subject to excess profits duty, if any.

GREENWICH INLAID LINOLEUM.—After providing for depreciation of investments and leases and plant, and writing off £3,489 for expenses of new share issue, the accounts for the year to December 31, 1919, show a profit of £27,314, from which must be deducted the loss of £10,890 brought forward, leaving a credit balance of £16,423, to be carried forward.

JOSEPH CROSFIELD & SONS.—1,500,000 7½ per cent. "A" cumulative preference shares of £1 each are offered at par. The authorised capital is £10,000,000, of which £2,900,000 has been issued. The present increase is necessary to provide for the further expansions and increases in works, premises and plant, investments and stocks which have been made in the last five years.

COURTAULD'S, LTD.—The share capital has been increased from £2,000,007 to £4,000,000, by the capitalisation of £1,990,093, consisting of £1,500,000 standing at credit of general reserve at December 31, 1918, and £499,993, which the directors carried to the credit of that account out of the profits of 1919. (A notice of the report for 1919 was published in THE CHEMICAL AGE, March 13, p. 290).

DORMAN, LONG & CO. The directors have decided to ask the shareholders to sanction an increase of capital to cover the extension of the undertaking and continue expansion of business. Proposals will be made to create 3,000,000 ordinary shares of £1 each to be offered share for share to existing ordinary shareholders with power to dispose of their rights. This will increase the capital of the company to £7,500,000.

SEAGER, EVANS & CO., LTD.—In order to take advantage of proposals for acquiring other businesses and to expand the company's export trade, the directors of Seager, Evans & Co., Ltd., propose making an issue of a further 86,481 shares of 25s. each at a premium of 25s. to all holders registered on March 29. An amount of 25s. per share will be payable on application, 12s. 6d. per share on July 6 and the balance of 12s. 6d. per share on October 6.

UNITED OIL & REFINING CO.—An issue is being made of 430,000 shares of £1 each, of which 180,000 shares will be issued in part payment of the purchase consideration and balance of 250,000 shares are offered for subscription at par. The company acquire from the Kansas Oil Syndicate the property and assets of the Kansas Oklahoma Oil & Refinery Co., Ltd., including lands and leases of oil-bearing lands in Oklahoma and Kansas, a refinery, and a pipe line. The properties have been in operation for some years.

UNITED INDIGO & CHEMICAL.—The directors propose to capitalise £47,500 of the undivided profits and to distribute this sum amongst the preferred and ordinary shareholders in proportion to their respective rights by the allotment of 285,000 fully-paid ordinary shares of 3s. 4d. each. They also propose to offer to the preferred shareholders 120,000 new preference shares of 12s. 6d. each, and to the ordinary shareholders 120,000 new ordinary shares of 3s. 4d. each, the offer in each instance being at par in proportion to their existing holdings.

Destruction of Roumanian Oilfields

The Question of Compensation

MR. JUSTICE DARLING, in the King's Bench Division on Tuesday, began the hearing of a claim by petition of right by the Roumanian Consolidated Oilfields, Ltd., against the British Government for £1,255,513, the value of the Company's property which was destroyed in 1916, together with 5 per cent. interest as from November 27, 1916, as compensation, for which it was alleged they were liable under an arrangement for the total destruction, in 1916, of valuable oilfields owned by the suppliants in Roumania, to prevent them from falling into the enemy's hands in the event of a German invasion. The amount was based on an audit made by the company's auditors, Messrs. Harmood Banner & Sons, and the arrangement guaranteeing compensation was alleged to have been entered into on behalf of the British Government by Colonel Norton Griffiths (now Colonel Sir John Norton Griffiths, M.P.), a member of a special British mission sent to Roumania with express instructions to destroy or procure the destruction of all petroleum stocks and wells, and refining and transport plant in Roumania. The answer to the claim was that the compensation was to be dealt with after the war by an international commission, the Roumanian Government accepting responsibility for the claims, and the Governments of Great Britain, France, and Russia guaranteeing to indemnify them. The suppliants denied being a party to such an alleged arrangement. The suppliant company have issued share capital of £1,177,840 in fully paid £1 shares, 4,700 of the shareholders are British, and only 38 are residents in the former enemy countries.

Sir E. Carson said that the suppliants claimed that by an arrangement entered into with Colonel Norton Griffiths the British Government were to pay compensation on the basis of the company's audit. On the other hand, the British Government said the compensation was to be determined after the war, and paid by the Roumanian Government, under an indemnifying arrangement between them and the Governments of Great Britain, France, and Russia. The suppliants disputed being parties to that alleged arrangement, and claimed that the British Government were immediately responsible. The total output of petroleum in Roumania in 1915 was 1,673,145 tons, and of that amount the suppliant company produced 100,616 tons of crude oil and 76,260 tons of refined oil.

The Attorney-General said the Court had only to decide the question of liability, and the amount of compensation would be considered later.

A document was put in, in which the company recognised the necessity of destroying the works for military reasons, and agreeing that any claim through the British Government should be based on an audit by Harmood Banner & Son. The Crown also submitted that whatever compensation was ultimately decided on, the understanding was that the Roumanian Government should pay it, subject to indemnification by the British, French, and Russian Governments jointly.

Evidence was given as to the destruction of the works and the further hearing was adjourned.

The Late Dr. Bernard More

THE funeral at Golder's Green last week of Dr. Bernard More, managing director of the Mond Nickel Co., Ltd., was attended, among others, by Capt. Barton, C.M.G., representing Sir Alfred Mond, and the following directors of the company: Mr. Emile Mond (acting chairman in the absence of Mr. Robert Mond, who is abroad), Mr. Sexton Noble, Mr. Robert Mathias and Mr. D. Owen Evans, barrister-at-law (secretary of the company). The service was of the simplest character, and in the course of a short address Mr. D. Owen Evans said, in recalling the chief incidents in the distinguished career of Dr. More: "He was born in Germany 67 years ago. He was the son of a distinguished professor of chemistry of that day, whose scientific work has been commemorated by a statue erected by his native city of Coblentz. His father was a contemporary and friend of the great Liebig. After completing his scientific and technical education our friend came to this country in 1876 at the age of 23. His reasons for casting his lot amongst us are well known to his friends. Many a time did he tell me that he came in quest of freedom of thought, of conscience and opportunity. The 44 years of his life in this country were devoted unceasingly to the application of his scientific and technical knowledge to the furtherance of British industry. It is a fine and remarkable record. In his association with Dr. Ludwig Mond from 1893 until Dr. Mond's death in 1909 he played a notable part in the foundation and in the remarkable development of a great industrial enterprise, of which he became a managing director, and so continued until the end. It can be truly said of him that he died in harness. He was suddenly seized with his last illness while attending to his duties at a board meeting of his company. As life was ebbing away he asked for a sheet of paper and pencil and he there and then wrote his last injunction to his colleagues, which is characteristic of the man, and deserves to be recorded for all time. 'Please, gentlemen,' he wrote, 'go on with the business; I apologise.'"

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette

Partnerships Dissolved

LAVENDER, JOHN HERBERT, and WHITEHOUSE, LEONARD, aluminium, gun metal and phosphor bronze founders, Stafford Street, Wednesbury, Staffs., under the style of Lavender & Whitehouse, as and from January 5, 1920, by mutual consent. All debts received and paid by John Herbert Lavender, who will continue the business.

SHARROCKS, EDWIN ARNOLD, and JEWELL, LOUIS REGINALD, wholesale paint, paper and varnish merchants and manufacturers, Vicar's Moss Mill, Elbow Lane, Rochdale, Lancs., under the style of Lawson, Jewell & Co., by mutual consent as and from December 31, 1919. All debts received and paid by Edwin Arnold Sharrocks.

Companies Winding Up Voluntarily

HUDDERSFIELD ICE & COLD STORAGE CO., LTD.—A meeting of creditors will be held at the offices of Pontefract & White, 6, New Street, Huddersfield, on Wednesday, March 31, at 2.30 p.m. Alfred Pontefract, Liquidator.

TYNESIDE ALLOYS CO., LTD.—A meeting of creditors will be held at the Company's registered offices, Pelaw, Newcastle-on-Tyne, on March 26, at 11 a.m. The notice of meeting is purely formal, as all debts of the company have been or will be paid in full. A. Y. Jones, Liquidator.

Liquidator's Notice

KENT PORTLAND CEMENT WORKS, LTD.—A meeting of creditors will be held at 36, Camomile Street, London, on Friday, March 26, at 12 noon. C. A. Radermacher, Liquidator.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of* 1908, *provides that every Mortgage or Charge, as described therein, created after July* 1, 1908, *shall be registered within* 21 *days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July* 1, 1908, *require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced since such date.*]

ANGLO-FRENCH DRUG CO., LTD., LONDON, W.C.—Registered March 12, £2,000 debentures, balance of £4,000; general charge. *Nil. September 18, 1919.

HAYS MARINE WATERPROOF GLUE CO., LTD., PORTSMOUTH.—Registered March 11, deposit of deeds securing all moneys due or to become due, to Barclay's Bank, Ltd.; charged on factory and premises, Chandos Street, Portsmouth.

KLIMBOWKA OILFIELDS, LTD., LONDON, E.C.—Registered March 10, £2,000 debentures (filed under sec. 93 (3) of the Companies (Consolidation) Act, 1908), present issue £1,400; general charge. *Nil. December 31, 1919.

NATIONAL DYES, LTD., LONDON, E.C.—Registered March 12, £100,000 debenture stock; charged on land, mill and other buildings and machinery, &c., at Bradford and Barking Creek, also general charge; also registered March 12, £125,000 mortgage debentures, to Lloyd's Bank, Ltd.; charged on raw materials, unmanufactured stock, stock in course of manufacture, &c., and book debts subject to above charge; also registered March 12, £20,000 debentures, to Barclay's Bank, Ltd.; general charge, subject to above charges.

TRIPLEX GOGGLE MASK & LENS CO., LTD., LONDON, W.—Registered March 9, £10,000 debentures (filed under sec. 93 (3) of the Companies (Consolidation) Act, 1908), present issue £2,000; general charge. *Nil. January 2, 1920.

Satisfaction

SAPON SOAPS, LTD., LONDON, E.C.—Satisfaction registered March 12, for £15,000, part of £20,000, registered January 5, 1920.

County Court Judgments

NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

BROOKS, T. H., 128, Nightingale Road, Hitchin, chemist. £11. 4s. 4d February 17.

OLIVER & CO., 487, High Road, Tottenham, Middlesex, chemists. £27. 18s. 7d. January 15.

POMEROY, F. T., Exchange Drug Stores, London Road, Thornton Heath, chemist. £10. 12s. 3d. February 12.

BRIGGS, THOMAS, Hyde Park, Leeds, chemist. £29. 0s. 5d. February 17.

PENNY, M. D. & SON, 11, High Street, Hull, analysts. £20. 8s. 1d. February 14.

New Companies Registered

The following list has been prepared for us by Jordan & Sons, Ltd., company registration agents, 116 and 117, Chancery Lane, London, W.C.:—

KENT PORTLAND CEMENT CO., LTD.—Manufacturers and workers in cement, lime, plasters, &c. Nominal Capital, £2,500,000 in 2,500,000 shares of £1 each. Minimum subscription, £7. Directors: H. Houlder, Heathfield, Addington; S. G. Robinson, Lancaster Gate Hotel, W.; J. W. Beynor, Merthyr House, Cardiff; J. Cory, Mount Stuart House, Cardiff; W. H. Dixon, 22, Albert Hall Mansions, W.; E. A. Gill, M.I.N.A., The Manor House, Frindsbury, Kent; C. H. Hatry, 56, Upper Brook Street, W.; Sir F. W. Towle, 3, Clarence Terrace, N.W. 1. Qualification of Directors, £1,000. Remuneration of Directors, £500 each.

LONDON LUBRICANTS (1920), LTD., 618, Old Ford Road, Bow, E.3.—Oil importers, blenders and merchants. Nominal Capital, £100,000 in 25,000 preference shares, and 75,000 shares of £1 each. Directors: A. D. Sanderson, 18, Woodcote Valley Road, Purley, Surrey; R. de Beer, Hillview, Russell Hill Road, Purley, Surrey. Qualification of Directors, £100.

McIVOR (R.) & SONS (NEWCASTLE), LTD., 311, Cleveland Street, Birkenhead.—Manufacturers and dealers in cement, concrete, &c. Nominal Capital, £15,000 in 15,000 ordinary shares of £1 each. Directors: W. T. McIvor, 311, Cleveland Street, Birkenhead; A. S. McIvor, 311, Cleveland Street, Birkenhead; J. H. Paterson, Lovain Row, Tynemouth. Qualification of Directors, 50 shares.

UNITED OIL & REFINING CO., LTD.—To acquire oil-bearing lands, mines, mineral and other properties and turn same to account. Nominal Capital, £500,000 in 500,000 shares of £1 each. Minimum subscription, 7 shares. Directors to be appointed by subscribers. Qualification of Directors, £500. Remuneration of Directors, £500 each; Chairman, £750. Subscribers: J. R. Beckensall, 56, Myddelton Square, E.C.1 (clerk); P. Kenny, 133, Rusthall Avenue, Bedford Park (clerk); and five others.

Benn Brothers Journals

Some Features of the Current Issues

AERONAUTICS.

"Cairo-Cape Flight—Two Cases of Sabotage," by Major C. C. Turner; "Inner History of the Big Aircraft Deal"; "Vindication of the Aero Engine."

THE ELECTRICIAN.

Second instalment. "Electric Winding Engines," by H. H. Broughton; "Modern Paper Mill with Electric Drive," by E. Tanner and G. Papworth"; and "Generation of Electric Power by Gas Engines," Papers read before the Institution of Electrical Engineers.

THE FRUIT-GROWER.

Report on London Wholesale Markets; Fruit and Potato Trades Federation Conference; and Hull Sale Rooms Controversy.

THE GAS WORLD.

"Rival Gasification Processes"; "Southern District Association of Gas Engineers and Managers"; and all the gas news of the week.

THE HARDWARE TRADE JOURNAL (Spring Issue).

"Labour Saving in the Foundry (VI.)," by Joseph Horner; "Money: What it is and How it Works," by E. J. P. Benn; "Gas in Relation to Increased Output"; and Institute of Metals Annual Meeting (*continued*).

THE CABINET MAKER (Spring Number).

"Colour and Form," by Minnie McLeish; "The Art of Home Making," by J. H. Rudd; "Loose Covers: How to Cut and Make Them," No. VII.; and "The Test of Time."

WAYS AND MEANS.

Special Survey No. 2, "Miscontrol or Decontrol"; Government Food Trading and Nationalisation, by Boyd Cable; Financial Article by Sir George Paish; The "Capital" Party, by the Editor; and "New Income Tax Code," by John Burns, W.S.

Book Received

CEMENT. By Bertram Blount, F.I.C. Monographs on Industrial Chemistry series. Longmans, Green & Co., London. Pp. 284. 8s. net.